

# AVIATION WEEK

A MCGRAW-HILL PUBLICATION

AUG. 22, 1955

50 CENTS



## *Inertial Guidance at Honeywell* **Automation in Navigation**

After many years of virtual monopoly as the number one device of long distance navigation, the sextant (and that includes the latest electronic models) may well have to make room for a promising rival.

The name of the newcomer is Inertial Guidance.

An Inertial Guidance System could be defined as a central information source that tells you where you're going by remembering where you've been. Ideal for missile guidance, it should prove invaluable in manned aircraft as well.

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A good part of the reason why the Honeywell Inertial Guidance System promises such an advance can be attributed to the fact that Honeywell manufactures a line of HIG floated gyros. They are the world's most accurate air-borne gyros. And such gyros are basic building blocks for an Inertial Guidance System.

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RESEARCH KEEPS

**B.F.Goodrich** FIRST IN RUBBER



## New De-Icers improve air flow on TWA's and Northwest's Super Connies

TWA'S AND NORTHWEST'S luxuriant new Lockheed 1049-Gs can successfully fight ice regardless of air speed and rate of accumulation. They're equipped with B.F. Goodrich parametric De-Icers.

This photograph shows an important part of the De-Icing system—new B.F. Goodrich overwing wing De-Icers (infrared). The small rubber tubes that inflate as prop-off air is lost fit in line with the air stream. This unobstructed tube arrangement permits the flow of air over the wings at all times—even during the brief inflation cycle. Photo: report-

new chlorobutane De-Ices give the plane a "better feel"; do not alter air flight characteristics.

Executive road travel and flight prove that the air handling efficiency of the new overwing design equals performance of the B.F. Goodrich parametric De-Icers that are used on the 1049-G's propengines and wing tip-sweeps.

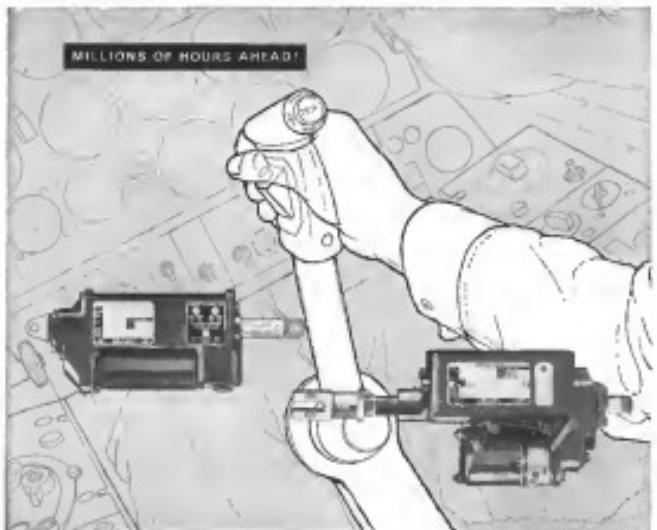
This B.F. Goodrich De-Icing system, with new chlorobutane De-Ices, was developed specifically for the Super Connie. It's a typical example of how B.F. Goodrich can design air protection to

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To meet these requirements AllResearch actuators, engineers and craftsmen are needed now. Write for information.

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AUGUST 25, 1963

# AVIATION WEEK

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# NEWS DIGEST

## Domestic

**XF-105 vertical-takeoff fighter** moved last week from Rockwell International Co.'s San Diego plant to Edwards AFB, Calif., for flight testing at Air Force Materiel Command's Aviano Weapons Test Center (Aug. 8, p. 9). Although hidden under a massive Martinet as it was carried by truck convoy to the rail cars, the VTOL's short-stroke delta-wing, stable foreplane and triangular fin were clearly outlined. Small flaps-like surfaces were located near the wingtips. The XF-105 is USAF's first vertical-takeoff aircraft and the only VTOL so far to be powered by a turboprop engine—a Rolls-Royce Avon with afterburner.

William P. Lutz, board chairman of Lutz, Inc., and Carl Gossen, president of the company, announced plans to offer a "precision electronic movement" to the aircraft industry. Objective is to seek out European designs of equipment that could be fitted into his company's line of systems and aerospace products.

**Firn simulator** for training guided missile crews has been developed by Lenix Aviation, Inc., a unit of the Air Force and delivered to Patuxent AFB, Md. The new device simulates radar guidance of a Martin Matador and will be used to train men in control and guide the ground-to-ground target missile.

**Bell Aircraft Corp.** has received NASA's Science & Engineering Corp. to evaluate the firm's booster's potential applications in the space energy field.

**Nuclear aircraft development** at Convair-Fort Worth will be directed by a new department. Activities range from the new six-decay De-9 N-Lite closed nuclear aircraft at Fort Worth.

**Prototye** Boeing 707 jet tanker transport has logged more than 200 hours in approximately 115 flights. Most of these have been high-speed runs with the new strengthened refueling hose installed.

**Production** section at Westinghouse Electric Corp.'s jet engine plant in Kansas City, Mo., started a new contract Aug. 14 to end a two-month strike. The agreement, negotiated by United Auto Workers (UAW) and management officials, calls for a wage increase of 23 cents an hour.

**Two Republic F-84Ps** flew nonstop Aug. 17 from Strategic AFB near



**FJ-3 Starts Qualification Cruise**

North American FJ-3 completed four Navy fighter jet carrier qualification cruise. In the foreground is spare launching hook for the FJ-3. In the background, members of the onboard support crew are standing by another Fury to carry up on the deckhand and tie launching FJ-3 is powered by 7,200-lb-thrust Wright J65 jet engine without afterburner.

London to Adana, Tex., in 10 hr. 48 min. The USAF's light bombers were intended during the 4,415-mile flight by KC-97 bombers.

Aerospace 6000 will be carried out by the 13th Air Force this fall to support the Navy's Operation Sharp Fence, a scientific expedition funded for U.S. participation in the Antarctic Geophysical Year. The 16th Air Force conducted Operation Overcast to Japan, largest and longest map shift in history (IAW July 18, p. 13).

**General Dynamics Corp.** net income for the first half of 1955 dropped to \$9,394,257 from \$9,460,525 in mid-1954. Net sales totaled \$47,098,822, compared with \$52,340,639 for the first six months last year.

**Noorduyn Aircraft, Inc.** declared a fifteen-cent quarterly dividend on capital stock, payable Sept. 10 to shareholders of record Aug. 26.

## International

**Prototyp** Vickers Viscount 700 took off from Britain and will fly over a month of formal trials in South Africa. Purpose of the trials is to test the Viscount's four Rolls-Royce Dart RMs, 6-type 510-horsepower engines in high-temperature conditions.

**Tow Japanese aircraft builders**, Shin Mitsubishi Heavy Industries and Kawasaki Aircraft, received procurement orders for production of jet fighters and transports. The orders, negotiated by United Auto Workers (UAW) and management officials, call for a wage increase of 23 cents an hour.

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## Northrop Scorpion's Cockpit Temperature Controlled By New Lightweight Unit

New Clifford amplifier features utilized construction, ruggedized, miniaturized components, novel pulse element

Weighting only 254 gm. and measuring 4" x 3" x 3", Clifford's control box marks a number of advances in the field of aviation temperature control.

In addition to its small size and light weight, the control box design embodies several important advantages in service.

**Utilized construction** makes it comparatively simple to locate a malfunction in service. Quality reflects the care that goes into the design, assembly, and get the plane back into the air quickly.

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**Physical and electrical designs** are both concerned with the performance of the device. Enclosed input values are held to optimum levels to insure long trouble-free service. Physical arrangement of parts promotes maximum heat dissipation.

Complete system of Clifford design and manufacture comprises temperature sensing elements, temperature selector, and control box.

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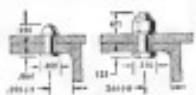


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hi-SHEAR and high strength sheet  
stainless bolts, per thousand  
pieces and using a 15% "downtime"  
to gain length=4450 lbs. shear,  
the bolt-to-hat weight is  
almost double that of HI-SHEAR.

HIGH 84 Shear Weight - 4450  
HI-SHEAR Bolt Weight - 222  
**16.57 lbs.**

**HIGH 84** Sheet Bolt Weight - 4450  
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Weight - 222  
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## AVIATION CALENDAR

Sept. 3-5-Twenty-ninth National Aircraft Show, Philadelphia International Airport.  
Sept. 4-11-Show of British Aircraft Constructors, Aircraft Show and Flying Display, Farnborough, England.  
Sept. 4-11-McCormick Tool Building's First Production Engineering Show and Machine Tool Show, Navy Pier and McCormick Place Auditorium, Chicago.  
Sept. 7-9-American Society of Photogrammetry, annual technical Conference and Trade Show, Sheraton Hotel, Los Angeles.  
Sept. 10-12-Patt & Whalen Aircraft Forum, Wyndham N. J. Second forum will be held Sept. 16 in Miami.  
Sept. 12-15-American Meteorological Society's 17th National Meeting and Tenth Weather Radio Conference of the U.S. Army Signal Corps, Fort Monmouth, N.J.  
Sept. 13-16-Government Society of America, Instrumentation Conference and Exhibit, Shrine Auditorium and Hotel Regency, San Francisco, Calif.  
Sept. 14-Institute of Radio Engineers Symposium on Antennas, Cedar Rapids, Iowa.  
Sept. 17-18-American Airlines Assn., Convention and Fly-In, Orlando, Fla.  
Sept. 19-21-American Rocket Society, Winter, Fall Meeting, Los Angeles.  
Sept. 21-22-American Institute of Engineers Forum, presented by Pratt & Whitney and General Motors, Hotel Dallas.  
Sept. 21-22-American Helicopter Society, second West Coast Forum, Hollywood Roosevelt Hotel, Hollywood.  
Sept. 21-22-American Society of Electrical Engineers and Institute of Radio Engineers, Post War Seminar Hotel, Hotel Sept. 29-30-Hillside Technical Conference for Astronomers, Hill Auditorium, Hotel Statler, Washington, D.C.  
Oct. 4-5-Annual National Electronics Conference, Hotel Sherman, Chicago.  
Oct. 4-6-Eighth annual Aircraft Spool Ring and Spudring Conference sponsored by Chicago Spool Pipe Co., St. Louis Hotel, St. Louis.  
Oct. 4-6-International Aviation Assn., symposium Meeting and Forum, Sheraton Cavalier Hotel, Detroit.  
Oct. 8-15-1955 National Aerospace Conference, sponsored by American Association of Airport Administrators, University of Oklahoma, Norman, Okla.  
Oct. 9-10-World Market Fair and Exposition, National Guard Armory, Los Angeles.  
Oct. 11-15-Society of Automotive Engineers' Golden Anniversary Annual Meeting, Hyatt Regency Hotel, Hotel Statler, Los Angeles.  
Oct. 17-21-National Space Council, 1955 National Congress and Exposition, LaSalle and Congress Hotels, Wash. D.C.  
Oct. 17-21-International Air Transport Assn., 11th Annual Meeting, Hotel New York, New York.  
Oct. 20-22-Ninth National Space Abstraction Symposium, Aeronautical Research Foundation of the Illinois Institute of Technology, Chicago.

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## WHO'S WHERE

### In the Front Office

Frederick C. Kressel, chairman of the board, Thomas A. Edison. Other officers include Arthur D. Lewis, president and chief executive officer; Jack C. Tolson, vice president.

Edward M. Powers, recently named as managing partner, is director of Curtis-Wright Corporation.

Raymond T. Rodeo, treasurer of Vitae Corporation of America. Also promoted: John H. Cooper, controller; Cooper for many years associated with Hercules Board of Directors; and of United Aircraft, Chicago; George S. Smith, Vice President and Director, Vitae Corp.

Robert E. Feltz, was president/marketing of Elco Inc.

Ronald G. McNeill, administrative assistant to the chairman, Household Finance Corp. McNeill formerly was a flight Attendant Company executive.

Carl J. Arkey, vice president-sales of Alcoa Instrument Corp.

### Honors and Elections

George R. Millerberg, chief of engineering, Bell Telephone Lab, New Jersey Research Station, elected chairman of the Institute of the Aerospace Sciences, Los Angeles Section.

J. O. Treadwell, vice president-controller of Bausch & Lomb Optical Co., president of the State Council of the Civil Service in the state of Ohio. Ohio are officers: Eric Goldstein, past controller of Douglas Aircraft Co., vice president; John J. Glavin, assistant controller of Canadian Pacific Air Lines; vice president, John L. Gough, manager of Canadian Pacific Air Lines; and assistant manager, Fred C. Taylor, controller of Delta-Cats Air Lines, secretary-treasurer of the Airline Control Council.

### Changes

Craig C. Thompson, report consultant to the Aircraft Owners and Pilots Association. Thompson formerly was vice president of Sales to Lines, responsible for the Airport Operators Council and special representative of First Air, Civil Aviation Administration.

J. Ross Brown, chief designer of A. V. Roe, Midsomer Norton, England. He succeeds S. G. Davies, who resigned.

F. M. Franklin, director of engineering, light aircraft for Canadian Carriers.

Robert C. Anderson, manager of the methods, standards and administration department, Ford Avionics Engine Division.

Edward J. Duggan, named to the general manager of Aeritalia Standards, Inc.

Gordon Dugdale, manager of the design office of Field Aviation Co., Ltd., Oldham, England.

Walter B. Yost, chief engineer of McCleary Industrial Corp., Hawk V. Schreiber, director of sales manager.

Joseph B. Lasser, Jr., director of public relations for Nitro-Benzeno Prod Co.

## INDUSTRY OBSERVER

►Boeing's KC-135 jet tanker and its 707 commercial transport will each be 1 ft. larger in diameter than the 707 prototype and 40 ft. higher alt. of the wing.

►First stage status blade on Pratt & Whitney JT5 turbojet is approximately 10 ft. high, indicating large air-handling capacity of engine. Low-pressure compressor has 9 stages; high pressure compressor has seven stages.

►F-94 fitted with long sweep-wing, windmill-shaped nose has been observed in flight. Nose section probably houses missile electronic gear for guidance testing, thus involving exploitation of the electronic equipment in its natural missile trials.

►Hawker will show two new versions of the Hunter fighter at Farnborough this year. One will feature side-by-side seating. This aircraft was originally designated as a trainer, but the manufacturer is now planning it as an all-weather fighter. The Mark 6 Hunter, equipped with an Rb-29 Rolls-Royce Avon jet engine, will be shown. Third of the aircraft is now 12,000 ft. approximately double the thrust rating of the earliest Avon. The modified Mark 4 Hunter will be displayed at the Farnborough show with a full tactical load.

►"Vortex transonic" is expected to use fuel in high speed aircraft by enabling planes to locate fuel storage tanks that increase ground speed. The device, under development by Aerospace Research Foundation of the Illinois Institute of Technology for the Air Force, also will provide accurate and important information for predicting weather conditions. Other applications of vortex tubes for storage fuel control systems are being studied.

►Martin's XPM-1 jet SeaMaster has been undergoing flight tests for the last three weeks. Initial tests have been reported by the company as being satisfactory.

►Menosuch advertisements in German magazines state the company is manufacturing cabinet rollers and towing machines "and in future also aircraft plates."

►Convair's supersonic bomber, the B-58 Hustler, is proceeding on schedule, according to Gen. Edwin W. Roskopp, commander of the Air Materiel Command.

►General Electric's J47 engine has undergone more than 20,000 design changes in the past eight years.

►Britain's Ministry of Supply and Gloster both drug agents that the English Electric Canberra will be used as a night fighter after the Joske comes into widespread operation. Reports grew out of the flight testing of a Mark 2 Canberra equipped with a non-rotating radio mast. The Mark 2 Joske is reported using a more powerful Sapphire engine than the one used by the Mark 1.

►McDonnell's of the British Oberon engine has been run on a test bed to 16,000 Rpm. The Oberon 106 and all succeeding modifications are designed for supersonic speeds.

►Commercial jet林 can get a much larger share of the USAF engine market if they had the right type plane plans for the mission. Air Materiel Command is eager to increase the amount of work done by contract carriers but cannot find companies which have the proper equipment.

►An Avco Avimetrics research rocket has carried 150 lb. of scientific instruments to an altitude of 100 mi., setting a record for single-stage rockets. During the International Geophysical Year, 22 Avco-Mets will be fired at Ft. Churchill, Canada.

## Washington Roundup

### Wilson Is Peeved, Too

Defense Secretary Charles E. Wilson is sympathetic with members of Congress who do all they can to inform the public about the comparative strength of the U.S. and Soviet air forces.

There is no catch here by Rep. Ernest F. Sekretar (R-Kan.) and Senator Wilson during hearings on an Air Force request for additional funds.

Rep. Sekretar: "All of us should get the same story. I do not know who, among, whether in CIA [Central Intelligence Agency] or in the Air Force Intelligence, or the aviation industry, or in the Air Force, should ever give Senator Symington or any other member of the Senate information that others of us apparently never get."

See Wilson: "If you can't prove it at that, all I can say is, 'I hope not and I'll prove you wrong.'

I do not know how to stop it."

Rep. Sekretar: "When he comes out with statements such as he made on the floor of the Senate, which now do not appear to be factual, with no substantiation from anyone in the Air Force—"

See Wilson: "We have no rights on the floor of the Senate."

Rep. Sekretar: "You have around 500 men down there engaged in public relations work, and you have nearly 55 million to spend for publicists."

See Wilson: "Yes, sir."

Harold Talbot, then Secretary of the Air Force, said that Sen. Symington did not get his information solely from the Air Force.

### Another Pentagon Change?

Shift of Donald A. Quisenberry from Assistant Secretary of Defense for Research and Development to Secretary of the Air Force has sparked Pentagon speculation that other changes are in the making. Generally, USAF is happy as indicated by the reaction in the Quisenberry appointment at the Air Force Academy convention (see p. 12). In addition, there appears a strong possibility that the vacancy in the top R&D post will give Defense Secretary Wilson a chance to let go at least one of the three-man research and development committee.

The investigation that the offices of Assistant Secretary for Research and Development and Applications Engineering be combined. The May report called their situation "severe duplication." Pentagon observers consider it unlikely that Paul D. Newkirk, former Washington official now filling the Applications Engineering post, will be the choice to fill the combined position if Wilson takes the opportunity to effect a reorganization.

### Presidential Flight

Sen. Warren C. Magnuson (D-Wash.) has asked Civil Aeronautics Administration to furnish him details on the extensive protection and safety measures employed on President Eisenhower's trans-Atlantic flight to the "summit" meeting at Geneva. Measures reportedly included stationing a Navy plane over 400 mi. along the route in addition to U.S. Coast Guard search.

Present priorities for commercial trans-Atlantic flights have been the subject of strong criticism from pilots and airline executives. Present priorities in emergency communications consist of a call from the airplane to alert

for information on the location of the nearest surface ship. The ships often in close proximity with the surface ship, attempt to bring them together. No direct communication between the ship and aircraft is possible in most cases since the vessel lacks the necessary frequencies.

### Navy's SeaMaster Stand

New buzzards have taken a new firm stand. They are again releasing photos of the seafloor. Marine PGM SeaMaster takes the place in standing on the ground.

Flying pictures are out, despite the fact that the aircraft is a cameras sight to wouldn't fit in the size of Middle River and River, Md. Navy says photos will not be released until complete has finished its "pervious collection test." Meanwhile, these relatives have more snapshots than the Navy and the SeaMaster's flights are a common topic of conversation.

### No Solution to No-Show

Scheduled airline traffic officials are still without radio-link agreement on a solution to the increasing problem of no-shows and late cancellations. In the last four months, two federal agencies have issued separate and somewhat parallel bills to iron down the two major sources of the no-shows system. Late last month held at the Air Traffic Conference special Chicago meeting when the proposals submitted were rejected.

Next attempt to resolve the problem was left up to a new ATC special committee which has been authorized to report at the regular congressional meeting in November.

Prospects of agreement are considered brighter as the new eight-man group is composed of the managers of individual computer plans, which have been the biggest obstacle to consensus.

### CAB Doldrums

Traffic of activity at Civil Aeronautics Board has slowed to a virtual halt during August. The Board has cut its work schedule for the month to a bare minimum, and Chairman Ross Reeder is over for most of the month as an inspection tour of airlines located in the west. Activity should pick up sharply in the fall when the Board makes its decision to rock major proceedings in the New York Change Case, the large Ingraham Case and the Denver Service Case. All two or so major policy decisions and all are supposed to be decided by the end of the year.

### 'Official Use Only'

On June 1, 1954, a Department of Defense directive caused a new classification "For Official Use Only" and set forth the purpose "to insure the proper custody, preservation and use of official information which requires protection in the public interest but which is within the purview of Executive Order No. 10531."

Later Pentagon publications to cover the "For Official Use Only" classification. The Telephone Directory.

—Washington staff

## more miles for missiles

Out where the air is thin, where every ounce of dead weight costs miles, rockets and guided missiles are reaching closer and closer to the fringes of space.

Pastushin Force Ejection—product of years of specialized research—assures safe, positive ejection of missiles, rocket, bomb and aircraft components.



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AVIATION CORP., Los Angeles, Calif.

## Speed R & D, USAF Orders Industry

**U. S. survival depends on 'exploratory development' for weapon systems advances, Gen. Power tells AFA.**

By Claude Wilke

San Francisco—The U. S. Air Force this week is challenging the American aircraft industry to meet the threat of Russian aerial power by increasing its own striking power.

With the shadow of Russian power hanging over their four-day annual meeting here, more than 1,100 delegates of the Air Force Asia Board have voted warnings and demands for action.

• Lt. Gen. Thomas S. Powers, commander of the Air Research and Development Command, said air survival now depends on a "vert amount of exploratory development" that will isolate big gaps prevalent in weapons makes developmental."

• Dr. H. Gaylord Steer, USAF's chief scientist, and Americans who share Russian scientific ability. He and facts brought to light earlier this year, which include the Soviet's weapons development, are "urgently called to act." To start it, he said, the overall industrial team take "radically different" steps to improve the quantity and quality of ingenuity and utilize them effectively.

• Trevor Crofton, USAF Assistant Secretary for Research and Development, and Congress will be asked for a supplemental budget of \$100 to \$200 million for R & D. In addition, at a closed meeting, he made the charge that the Air Force's present budget, now being reviewed by the budget committee, has been cut by 10 percent since the start of fiscal 1959 and the backlog of more than 57 billion.

• Roger Lewis, USAF Assistant Secretary for Material, warned that the Air Force of 1960 to 1965 "is in the middle, on the drawing boards and as the prototype stage begins." In a pointed reference to the industry, he said, "Development cannot be preempted, but it can be delayed by lack of purpose, caution, misunderstanding and caution."

• Air Force Asia, in its annual statement of policy and strategy that Powers is asked to submit to the Air Force, urged the development of ballistic missiles.

USAF charged that while this situation exists, "Our own development program must be based on a business-as-usual basis."

### GE Reorganizes Engine Program

General Electric Co. is the last major defense contractor to announce it has reorganized its military business as part of the Air Force's demand for faster component development and a larger "margin of development" for tomorrow's weapon systems.

Jack S. Parker, manager of GE's Aircraft Gas Turbine Division, and the company's planning vice president which are not yet installed in Air Force programs.

He says with Air Research and Development Command's demand that the engine development cycle be speeded to meet that of the aircraft system, Parker and GE are making a new effort to plan products as advance of defense requirements.

"This," he said, "is part of the industry's responsibility as the military-industry partnership and is being seriously encouraged."

A rule of thumb, he says, is to move up plans. In this defense, air and space environment, and not just the new principles of propulsion which we believe will eventually be needed. Such rapid planning not only will yield superior products, but also prevent us to schedule them economically, thereby protecting the mobilization base.

USAF emphasized it expects the philosophy to become widespread among all component makers, stimulating competition and resulting in designs of parts that will be needed for more advanced weapons.

The resources of GE's program:

- Establishment of permanent defense product divisions in the enterprise. Technical effort no longer works on engines or electronic equipment as temporary duty.
- Increase in the amount of company money put into development facilities.

In addition to improved qualities, the Air Force is letting its rights to provide more striking power. Col. Nathan F. Tanning, Chief of Staff, told the convention "we all know that a 177-wing Air Force is not a permanent solution to our airpower needs" (AW Aug. 15, p. 13).

### Quarterly Appointments

Offering the atmosphere of crisis on the field of aerospace, R. & D. was the announcement on the opening day of AFA's convention session that Donald A. Quisenberry had been named to replace Howard E. Talbot as Secretary of the Air Force (AW Aug. 15, p. 7).

The next came from Washington only a few hours before Gardner spoke to several hundred representatives of the aircraft industry. He made it clear that USAF could not be encouraged from the fact that the Defense Department's funding research and development expert had been named USAF Secretary.

Gardner pointed out that this is the first time a man of Quisenberry's remarkable stature has held the post, adding that the choice was appropriate in view of the growing Soviet menace. He said he had not consulted with Quisenberry about the need for supplemental R. & D. funds, but indicated that he expected the new chief to support the request when Congress convenes.

### New Evaluation

Gen. Powers, and the central rationale for fast development is to keep the war force before USAF's current decision to eliminate design studies from the weapons system procurement procedure (AW Aug. 8, p. 12).

Following his meeting with aircraft industry leaders, Powers and ARDC studies indicated that most of the savings through an acceleration of new weapons tool place in the preparation and execution of the review paper process.

Powers said that under the new Air Force procurement system a clearly Phase I contract would take the place of preliminary design studies (AW Aug. 8, p. 12) in effect it will be made "to receive the go-ahead of development" we live on the check.

Gen. Powers did not part all of the blame in this respect on industry. He and leaders, in reply to a question by AVIATION WEEK, that a great deal of

the last time was spent by USAF in making an equipment evaluation.

It takes so long, he said, "that by the time a winner is chosen it involves down to, what is the winner all?"

Gen. Powers said that under the new system he still hoped that the maximum number of contractors chosen to produce a prototype will be given as much design freedom as possible.

He based these statements that sped the Soviet missile race.

• **Russia's production rate of engineering guidance has come that doubled and its missile numbers they have already caught up with us in balance if paper analysis and paper competition are caused too far. While important to lead air development line, analysis can easily outrun reality.**

• **The overall quality of a Russian engineering design is equal to that of our own but our economy often.**

• **Differences in the two defense systems give all the advantage in the field of strength and engineering training to their side.**

• **Because they can choose their target only in the fields where it is most needed, thus ensuring that greater gains are on earth than the U. S.**

• **Missile quality cannot win the race for increased air superiority unless something radically different is done.**

• **It seems to us that we now have no choice but to follow two courses of action, one to improve our educational system as well to get increased quantity and quality in science and engineering, the other to more efficiently employ those individuals trained well we have. Both of these will take some doing."**

In the course of using U. S. aircraft more effectively, Dr. Steer indicated, USAF's own procurement policy as

de which design studies are eliminated, is an essential last step. His comment:

"The selection of the most promising weapons system to development, and the planning which precedes the development, become primary areas in the pursuit of limited technical resources and power and development budgets."

### Analysis and Reality

"Industry, tolerance, and planning requires considerable analysis. But how often do we realize how led us to an balance if paper analysis and paper competition are caused too far. While important to lead air development line, analysis can easily outrun reality."

"It is necessary to substitute paper analysis for real development. If can do, and probably has been in the recent past, overdone. This overdone, it can stimulate a false concern, even though analysis is relatively cheap in terms of dollars."

"It is a false concern," he said, "because each year we require a continuation of our best technical talent, when analysis is discontinued the development of the system still must be carried out full."

"The unique genius talents go a lot further in hardware development than an analytical study for he can be greater help from the supporting elements of technology."

"To keep the balance between analysis and hardware development and to select our most promising development line is again a great challenge to us," Dr. Steer said.

## Industry Hedges on New Policy

San Francisco—Industry spokesmen last week expressed general agreement with Air Force elimination of weapons design competitions but warned that such a system is open to abuse.

Gen. Robert W. Roschke, of the Air Materiel Command, and Lt. Gen. Thomas S. Powers, of the Air Research and Development Command, were both on hand at the Air Force Asia gathering to explain the new procurement policy to industry leaders.

They emphasized that the main objective is to speed weapon system development and reduce the time it takes to get new aircraft into the fleet. The USAF is in a more competitive position in weapons which has shown constant results of unsatisfactory development cycles.

Industry representatives were quick to point out that the new procurement plan should use both engineering time and red money.

"We want \$5 million in our design competition," a Lockheed Aircraft Corp. official noted. But at the same time,

industry spokesmen expressed concern over a number of phases of the plan's operation.

There were some of the questions raised by industry spokesmen who were satisfied by Air Force's wish to comment on the new Procurement policy:

• Is there a danger that such a system can lead to political abuse with awards to favored companies?

• Does it mean that the U. S. uses more and more much-needed weapons against the company with the best idea or the company with the cost-cut?

• Does it mean a closed-door policy for review not already by the defense bureau?

• How will it affect component manufacturers?

• Is a new status—with the question of shifted money—the time it was used only to be followed with a legal status? Two typical responses, the second by J. G. Zerby, Convair sales director:

"The system is inherently dangerous, and there will be a temptation to abuse it. But there will not be much oppor-





CIAA, Talbott and Wilson . . .



SMILE, at model ceremony.

## Talbott: Praised and Criticized

The career of Harold Talbott as Secretary of the Air Force closed with a hush public-prime-and a promise of further investigation in the next Congress.

In addition to being awarded the Medal of Freedom—Defense Department's highest civilian award—in a path to retirement, there were these developments following Talbott's abrupt resignation:

• Roger Lewis, who recently resigned as Assistant Secretary of the Air Force for Materiel, appreciated Talbott's "sound, forthright, and calm" who "seems to me to be thought-oriented people"; or an addressee presented to the annual convention of the Air Force Association (p. 42).

• The Senate Permanent Subcommittee on Investigations, which held the hearings which ultimately resulted in Talbott's resignation, firmly closed the door on any further investigation. They observed in a formal and issue-motivated statement that the issue was the property of Talbott's successors and that this was "satisfactorily resolved" by his resignation.

• Sen. Wayne Morse (D-Ore.) declared that he still "want[s] an investigation of the continuing interests of insurance men serving in the Roosevelt Administration in the Boeing and Convair Companies, of which he is a member. He anticipated that Talbott and Roger Key—who served approximately one year as Deputy Secretary of Defense and then returned to his former position as vice president of General Motors Corp.—would be key figures in the investigation.

### Praises from Lewis

Reporters noted that Lewis in delivering his speech to the Air Force Association mentioned two paragraphs in praise of Talbott which were in the prepared text. Lewis in his spoken address said:

well serve to the interests of our national security."

The formal statement of the Senate Permanent Subcommittee observed that before it were "numerous allegations that Mr. Talbott as his position as Secretary of the Air Force had perhaps indulged in unethical or improper conduct in behalf of Fred B. Magruder & Co. of which firm he was a partner.

### Committee Closes Hearings

"Mr. Talbott, after having had an opportunity to reflect evidence developed during hearings submitted his resignation . . . which has now been accepted."

"Accordingly the subcommittee decided that this matter had been sufficiently resolved. Therefore with the issuance of this statement, the investigation is concluded."

Upon closing offices, Morse declared, "Messrs. Wilson, Key, Stevens and Talbott not only did not anticipate the problem [of conflicting interests], but they usually insisted during their days of substantial holdings in corporations with which the Defense Department dealt. Finally and with reluctance they surrendered their stock holdings. Each can demonstrate without lack of understanding of the conflict of interest problem."

"Everyone shows," Morse charged, "that Talbott conducted and self-reviewed his office as Secretary of the Air Force."

### Talbott Piqued at Wilson, Denies It

Should Talbott spend his last hours as Secretary of the Air Force with a bitter verbal thrust at Secretary of Defense Charles Wilson, for failing to do "one thing to defend us?"

Reporters heard it, and it was widely published, along with Talbott's denial of the episode.

At a press session called to introduce incoming USAF Secretary Donald Quarles, Talbott left Wilson alone. While subsequently some news photographers Quirke, a newspaper reporter, Talbott told him, "I am not the last to leave." After a conference, two days previously, about being dismissed from the whole business of defense, Talbott, before Wilson replied, Talbott reportedly added, "You shouldn't have done it, sir."

A detail added by other indirectly quoted Talbott:

"He told me, 'Wilson, stop in the corner so we could congratulate him on his appointment of General Donnelly . . . and so tell him how pleased we are previously with the appointment.' He further stated that the idea of his leaving or offending Senator Wilson of anything is impossible."

The pertinent view of the press conference thereof: Talbott and Wilson, first, in what appeared a glum exchange, and later, in smiling face with Quarles.

That's Wilson's version, commented at his press conference.

Reporters, "Mr. Secretary, are the circumstances of Mr. Talbott's leaving causing a series of the frequent developments of what members of the Defense Department know?"

Mr. Wilson: "I am not conscious of it at all."

Reporters: "You are longer about Mr. Talbott's resignation?"

Wilson: "I was not dismissed over the whole business. I didn't say my part of it."

Reporters: "Were you dismissed about illegitimate underpayments?"

Wilson: "Just like I said. I didn't like my part of it. It was a very distressing matter. I feel like I have given one star after the last three words, and just let the record, this means I remain open to work on insurance also."



## First Details on Convair's Jet Transport

By William Coughlin

SAN DIEGO, Calif.—Convair's proposed jet transport, of which the first production aircraft sketch appears above—slightly resembles the Douglas DC-8 and Boeing 727 and would be capable of carrying between 80 and 115 passengers on 550-mile nonstop flights.

The swept-wing transport would be powered by four Pratt & Whitney JT3D engines—each providing 11,000 lb-thrust—mounted in pods swept sharply forward from the leading edge of the wing. The maximum passenger load would depend upon configuration and seat arrangement.

Convair has submitted an proposal for such a plane to the airlines but says it is not "locked" engaged in a jet transport sales campaign because of its belief that the current jet transport market is headed.

With perhaps only 100 planes in the picture for the first round of jet orders, the feeling at Convair is that

there will not be enough business for even two competitors to share the market.

Economics of operation would be similar to those of its competitors. The JT3D was recently introduced for commercial use by the Douglas DC-8 and the Boeing 727, and airline sources say they are not anxious to try for a three-way split on forthcoming airline orders. "We would be better off putting the same effort into both projects," a source concurred.

The Convair jet is of a fairly conventional design. Its nose has a nose wheel, however, then either the Douglas or the Boeing configuration and instead of a plow it is placed slightly forward to provide a portion of the tail surface of the fuselage.

The Convair design, although weighing in at a gross of well over 100,000 lb, would be able to operate from modern airport runways.

In route range would be comparable to those of the Boeing and Douglas aircraft Los Angeles to New York, for road-much 1 hr., New York to Paris, six and one-half hr., Honolulu to San

François, four hr. plus.

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Commenting on the similarity of the three jet transport designs, a Convair official said, "When you see the same engine, you are bound to come up with designs that are much alike."

Honored flight was reported several weeks ago to be interested in the Convair design for Trans World Airlines but more recent reports on the TWA acquisition indicate that no final agreement has been reached.

And earlier reports that Convair's jet transport entry was a de-tweaked design may have reached fruition as Avianca study which the company conducted some time ago on a military transport version of its delta-wing super-sleek B-58 boulder.

Convair believes that use of the

factors limiting the present or future market is that west-bound trans-Atlantic flights appear headed toward a considerable problem. Although this threat, with its competitors, is designed for aviation operations to Europe, levels would be sharply reduced under unfavorable wind conditions. The committee believes this factor will cause international carriers to move slowly on the proposed route.

Another factor is that, in order to make aircraft designs adaptable to future regions of higher flight and better specific fuel consumption—considerable redesign will be necessary. This would have present sailing routes by a round-the-world margin, according to a Committee spokesman.

## Continental To Get Local Route Certificate

Civil Aeronautics Board has proposed permanent certification of Continental Air Lines' local service Route 4, which was awarded in the absorption of Pan American Air Lines by Continental last April.

CAB issued 16 routes in Texas and New Mexico to nonstop passenger service to Continental while another seven points would continue to be served under the temporary authorization.

In the absence of objections within 15 days, the Board order then will be made final.

Continental is eligible for permanent certification of Pan American's former local route. The Board is still at the present required. However, to grant permanent local service authorization to more than one-half of the intermedium points listed for the new one application.

## Slick, Seaboard Order 1049H

Mark Airlines and Southern & Western Airlines have signed a total of seven Lockheed Aircraft Corp's all-cargo 1049H Super Constellations, replacing a previous Air Aviation Week that the two freighter owners would buy the transports (June 27, p. 90).

Seaboard placed an \$11-million contract for five of the freighters and Southern purchased two 1049Hs with a total value of \$4 million.

Both carriers and the two senior officials indicating cargo business. D. W. Beattie, Seaboard chairman, predicted the 1049Hs, relative to the domestic market would begin operations in October 1967, more than half year's 52,750,000 lb. S.A.W. President Edward A. Norden forecast "impressive expansion" of tonnage-Airline business. Addition of the 1049Hs, he said, will increase Seaboard's annual tonnage capacity to 15 million as of next Oct. 15.

Seaboard's Super Constellations will be delivered during the first three quarters of 1967, increasing its fleet to 25 transports. The carrier now operates three Douglas DC-8As, three DC-9s and 17 C-46s. Seaboard will receive its 1049Hs in January 1967. It presently operates four 1049D Super Constellations and six DC-8s.

For domestic operations, Seaboard plans on a maximum 1049H payload of more than 40,000 lb. Seaboard's peak payload for trans-Atlantic flights will total about 35,000 lb.

## ALPA Seeks Changes at Midway

An Late Pilot Alert called for immediate correction of certain conditions at Chicago's Midway Airport after the conclusion of the Civil Aeronautics Board investigation of the Jan. 31 crash of a Boeing 720.

An ALPA Air Safety Committee said it couldn't determine a probable cause of the accident which took 12 lives. But the group urged CAB to take immediate remedial action on a number of undesirable conditions at Midway.

The committee asked CAB to consider seven points:

- Midway's approach light system and runway lighting pattern are inferior and don't compare to Civil Aerobus' minimum standards.

- Weather conditions should be observed before entering the field rather than during patrols. ALPA also recommends caution in conditions of low visibility.

- CAB considers Midway's runway conditions slippery and calls them poor when dry, bad when wet. ALPA sees the majority of pilot signs the runway is short, slippery, bump and skewed.

- Boeing's Convair had two different types of instrument landing systems installed which may have led to unnecessary indecision in the conduct of approach and departure to Midway.

- Midway's taxi routes indicate that during the last five years 40% of flight time off aircraft's rate of descent was short three times the normal rate.

- Midway should be reevaluated immediately to convert or eliminate present obstructions which exist both inside and outside the airport boundaries.

ALPA singles out concrete runway markings as the cause of previous accidents and a contributor to the crash of the Boeing 720. It also urges a runway centerline and other obstructions, including approach light structures, should be painted with fusible markings which break when struck, rather than the present resistant type.

## Trunklines Cut Fares On East-West Routes

Trans World Airlines started the industry last week with a drastic fare cut for air-sea-freight service between major points on the East and West Coasts.

The airline anticipated a \$160 tonnage reduction in fares between New York, Philadelphia, and Washington and San Francisco, Los Angeles, and San Francisco has a \$375.50 roundtrip. The new fare schedule is effective Sept. 12.

American Airlines and United Air Lines matched the TWA rate within a few days. American cut its cabin fare to \$160 between eastern ports New York, Philadelphia, Baltimore, Boston and San Francisco. Oakland, Los Angeles and San Diego are the West Coast American cities. Civil Aeronautics Board for permission to make the new fare effective Sept. 12 to match TWA's starting date.

United's cabin fares are cut to \$160 tonnage between New York-Newark, Philadelphia, Baltimore, and Washington and West Coast points San Francisco-Oakland and Los Angeles. The United rate will become effective Sept. 16.

Fares for both American and United between Berlin and the West Coast are identical to TWA's \$175.80.

The new fares, equal to those charged by North American Airlines for nonstop service, are good Monday through Thursday on an extension plan. The \$160 fare applies only to a roundtrip flight completed within thirty days.

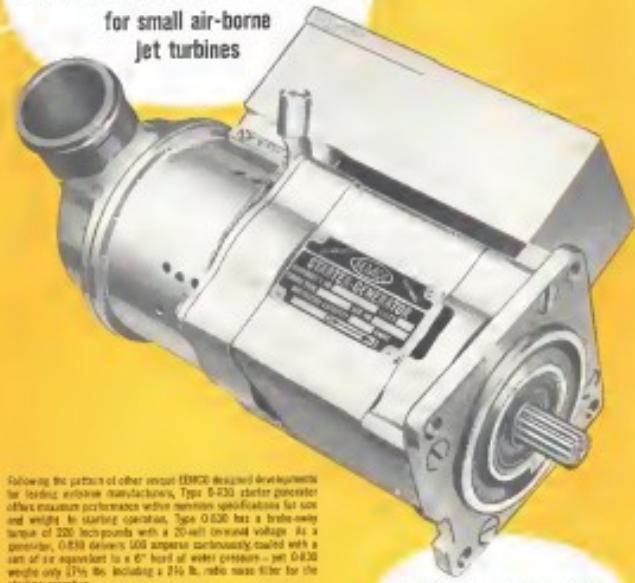
The tariff reductions filed by the three transcontinental carriers are subject to CAB approval. The Board has the option of suspending the fare for overnight service before they go into effect.

## Aussies Build Copier

Melbourne XM100, first helicopter to be designed and built in Australia, will begin flight tests next October. The two-place copier is the prototype for a five-passenger air taxi that Melbourne plans to construct next year.

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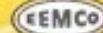


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## Convenient Roof Ports a Must For Economical Helicopter Flights

Rotterdam—Aircraft experts from 14 countries attending the second Helicopter Congress here urged the construction of more and better roof helipads and agreed that the future economy of a helicopter traffic system will be determined by the location of its landing sites.

Lothar Prang, home planning expert and helipad designer of Dusseldorf, Germany, told the Congress he had been July 29-30 under the aegis of the Rotterdam Helicopter Syndicate that a passenger-freight helipad, to be no useful, should be no farther away from the local market than the salient site.

Prang's studies of the passenger single helipad led to the following conclusions:

- Loss of time because of a distant landing site cannot be compensated for, even by a considerable increase in the running speed of the commercial helicopter.

- If the helipad is five minutes away from the center of the market, it is preferable to achieve average rates cataloged short distance air traffic in complete with neither traffic.

- Inherent advantage of elevated or roof helipads, whether or not they require limited surface area.

Emphasizing again the latter point, Prang said that an elevated site requires an area of 80 x 120 meters, whereas a level surface site with the same useful surface requires 210 x 180 meters, including extra running space and safety areas. He added:

"In view of the divergent interests of neighboring inhabitants, the econ-

omies caused by noise and appearance, the absence of obstacles, the possible sharing of a city's economic center through taxes, planning as quickly as possible the site of helipads, in looking over alternative sites of destination in view of probable future traffic density, possibilities for extending the landing sites, and local meteorological conditions are among the problems to be studied in selecting helipad sites."

J. B. Shapley, chief engineer consulting engineer on helicopters from London, and he suggested the roof helipad as "the only helipad worthy of future consideration." The future of the helicopter, Shapley said in his address, "is based on the way fact that it can go places where no other aircraft or man-made vehicles" visitors to the land requirements of the craft."

Shapley told the Congress that "any deviation from the center of the city in the transit areas of the world is a great sacrifice in the width of the helicopter." The width of the landing area of any helipad, he said, should not be less than twice the track of the undercarriage of the landing helicopter.

"A capacity of 80 seats," he added, "seems to be about the maximum which can be achieved without interference of passengers' discomfort." Whether the place of the pilot using helicopter the center of a city is caused in the case of a moderate size vehicle, and vehicles of helipads need not take much trouble over the prospect of pronounced increases in size than subjects of subway stations over the pas-

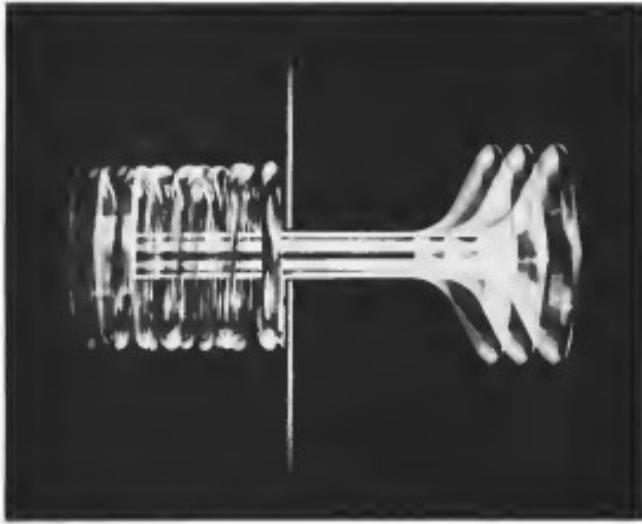
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parts of increasing the width of the task.

"Helicopters can, should and will be allowed as basis in. It is difficult to believe that by interpreting the same problem in different ways, the same problem is eliminated. In fact if there is a specific helicopter, none problem, it is psychological." It may be that people will come to accept the cause as helicopter because more common.

J. A. C. Tilanus, managing director of Rotterdam, told the Congress he considered the location of Rotterdam's heliport particularly good because it is located in the heart of the city, at a walking distance of the main railway terminal, the town hall and the Chamber of Commerce, and the shopping and office districts, he said. "It is near the big north-south highway running from France and Belgium to the heart of western Holland. There also are a good many bus and train stops in the neighborhood, while ample parking space is provided."

Tilanus explained that a secondary landing area has been provided outside the built-up area of the city in case the pilot turns as approach over the congested area were wider but weather conditions permit.

- Operation of this heliport is currently not a "must," he said. "The initial of the capital invested together with normal operation costs such as heating, electricity, and staff, are a heavy burden. Continuous operation to some extent may be within reach when the latest techniques will be adopted and larger aircraft flown. Until now, this heliport should be considered as a necessary link to the city's transport and communications system."

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- Another report at Tilburg led to acceptance of power facilities.

- Pending construction of a new international airport at Den Bosch, the Dutch government is asked to help plan and improve other facilities in the current field.

- Josine already has built a new runway at Amstel Airport and a hangar at Janssen Airport's runway.

## Arab League Plans Civil Air buildup

BONN, Germany—The Arab League Secretariat has drafted a new agreement outlining a unified civil aviation development program for its members as what countries believe to be the first step toward the formation of a single Arab aviation corporation comprised of a merger of all current air activities.

The draft agreement suggests improvements in airport facilities in Egypt, Lebanon, Iraq, Syria and Jordan. Some of these have already been started or are now being implemented. Work is going on under a plan to include:

- Construction of a new runway and lengthening of another at Cairo International Airport. These projects are nearly completed along with the installation of equipment for automated landing. Airport improvements also are being made at Luxor.

- Projects aimed at Ibadon have been completed including new terminal and instrument landing facilities. Ibadon airport got the first half of the year 14,700 landings and takeoffs and 875,972 passenger arrivals and departures at Bonn International Airport as compared with 12,233 landings and takeoffs in the same period last year.

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### Surplus C-82 Overhaul Starts

First of a group of surplus Fairchild C-82 Packets bought from Air Material Command by E. B. Smith Aircraft Corp. began "overhauls" prior to Miami International Airport. The plan is to overhaul and rebuild surplus aircraft for American, American and the New York South Airways registers and to sell off surplus aircraft. AMC will repair the engines C-82s to remove problems for a total of about \$100,000. Other plans to be developed of surplus YC-123s, YC-124s, C-123s, C-131s, C-141s and C-146s (AW May 16, p. 20).





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present, leaving a balance of 14,877.  
• The American World Airways Inc., subsidiary of 5,200 members, shows through excess of 1,000 up from July, offering a balance of 16,122, the present 14,877 members having 29,049 L members. Another 1,000 excess members

**McGraw-Hill** has announced the acquisition of **John Wiley & Sons**, Inc., one of the world's leading publishers of scientific, technical and medical books and journals. The transaction, which will close in the second quarter of 1994, is being conducted by **André A. Pichette**, chairman and CEO of **McGraw-Hill**, and **John H. Wiley**, chairman and CEO of **Wiley**. The transaction is being conducted through a subsidiary of **Wiley** called **Wiley Publishing**.

8 Pipe Masons Corp., Champlain, a 2,699-shareholder of 444 preferred by Sherman J. O'Gorman, the local building association, a 2,000-shareholder of 100 by W. T. Kline, and a 1,000-shareholder of 100 common shares by Howard E. Flynn, and 200 and 2000 shares by a closed holding of 100 and six thousand holding of 10,400; the group of 3,000 preferred shares by Weston G. Johnson, offices and drivers having no relation; a group of 1,000 preferred shares by W. Y. Smith, and a director having 100 shares.

- Middle Corp., et al America. Disposed of 15,000 common shares by Donald Russell, director, having a holding of 10,000.
- Negative Aviation Corp. Acquired 10,000 common shares by F. G. O'Brien, 49%.

\* **Water**. *Alvermont Corp.*, Association of 1000  
preliminary designs for a P. K. Knobbe, editor,  
including a building of 1,115' aspiration of  
400 cubic yards by H. F. Chapman, editor,  
producing a building of 1,049'.



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## 11. TERMS OF REFERENCE TO APPENDIX

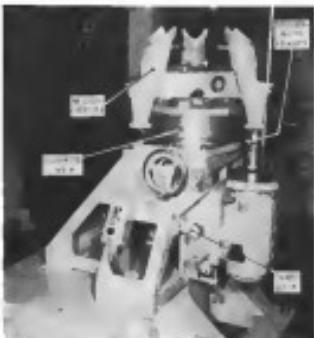
**LEAR**

**LEARN-BOMEK DIVISION** Abba Road, Elvria, Ohio.

# PRODUCTION



**MULTI-TOOL BORER** cuts four diameters in sequence. Four tools are mounted in single boring bar. Fresh obtained a 65 micrometer total within +/- tolerance of .0009 in.



**ALIGNMENT HOLES** in Northrop SM-62 Stark missile casting are bored, counter-bored and chamfered at this seven-axis horizontal mill to Northrop's specification by Cleveland Universal Inc. Co.

## Northrop Machines Stark Missile Castings to Superfine Tolerances

By Irving Stone

**B**ROTHFELD, Calif.—Final details of protection techniques used on the SM-62 Stark missile raised the extremely close tolerances to which Northrop Aircraft is working on the "bird."

The five special heat-shield castings for Stark missile engine cases are produced in tolerances between .5 and 10 mils, or .0001-.0003 in. Hand-lapping brings this down to less than 1 mil.

The machines are so precise, special optical fixtures had to be created to check the parts processed on the broaching and lapping machines.

Setup on the machines is a painstaking procedure. A lead or .05-power electronic caliper calibration on a reading microscope to insure precise setting of part and fixture before the run begins. Northrop's own careful authorizing fixture hand-lapping gives many hours of skilled labor.

A special design boring bar is a feature of the machine. Four DeVlieg Masterline tools, working vertically downward, are carried in the bar in sequence, to obtain a .65-micrometer total finish on the four diameters of the bore. The machine holds an overall diameter tolerance of plus .0009 in., minus .0001 in.

### Reverse-Vertical Borer

Aligned holes in the Stark casting are bored counter-bored and chamfered in a "tip-down" boring setup. A Pepe automatic precision spindle, working opposed arms (one each) of the base, bores in at only .0001 in. with each revolution of the four-head counter-clockwise. The depth each cycle is set at .0001 in. per revolution.

The machine, like the others, has a Cleveland Universal Co. machining table with a power scope added by Northrop.

### Tool-Test Borer

A specially designed boring bar is a feature of the machine. Four DeVlieg Masterline tools, working vertically downward, are carried in the bar in sequence, to obtain a .65-micrometer total finish on the four diameters of the bore. The machine holds an overall diameter tolerance of plus .0009 in., minus .0001 in.

The three-location 120 deg. steps in the indexing table are accurate within plus or minus 5 sec. of arc.

A lead tool advances the tool .025 in. in each revolution of the indexed wheel.

The machine was built by Northrop by Cleveland Specialties Co., Los Angeles.

### Miller and Borer

Precision angle boring is accomplished on a combination boring and milling machine. Two customized Pepe heads perform boring, counter-boring and milling in sequence at different angles. The boring tools develop a feed of about .02 micrometers per rev. at 1,000 rpm with a solid carbide cutter head.

Spindle angles are held to a maximum tolerance of plus or minus .1 mils of arc.

One vertical and one horizontal lead bar a common carriage do cutting too. Like other two-stemmed boring and counterbores.

### Compound Angle Mill

Two compound-angle mills used on the machine tool Pepe spindles, each driven by a three-ball system and a Hg. Motor Electric Co. motor, are fitted with DeVlieg center heads. A cam is used to operate both the



**COMBINATION BORER** and mill does job in rapid sequence. The boring tools give another finish of about .52 microns-inches 1 mils. The angular tolerance is held to .1 mils. of arc.



**HORIZONTAL MILL** machines the profile surfaces and bottom edge at 90 degrees in sequence with Pepe benders-spindles.

carriage heads and the revolved, which is powered by a Rotron Gear Co. servo motor.

Setting alignment is accomplished with a Sheffield Protractor, plus with Plumb line and optical comparators set up. The machine can be aligned to an accuracy of within .1 mils of arc.

Felix also constructed the horizontal mill especially to Northrop's specifications.

### Horizontal Mill

Two parallel surfaces and a shoulder opposed at 90 deg. are machined in this horizontal mill. Machining is done in sequence, using Pepe ball-driven spindle DeVlieg heads on Carbide cutters.



**THIS COMPOUND ANGLE MILL** machines the opposite fine tolerance surfaces leaving different edges. The horizontal way of the machine are lapped to within .1 secound of arc accuracy.



**CITICAL CHECK STAND** for the inspection of Stark machined casting which was as noisy as seven coffee pots.

## Fiber-Foil Blanket Insulates Tail Pipes

Stainless steel foil insulation ceramic fiber insulating blanket being made for tail pipes on B-47s, F-100s and F-35s. The blanket fiber is Corrosion Co. Fibreflex, an aluminum silicate fiber which has a melting point of over 1,000°F (AW Aug 23, 1952, p. 38).

The Fibreflex comes in foil to John P. Foster Co. of Santa Ana, Calif. Foster then laminates it to dotted densities at its speedily designed equipment (photo and page 7). Fibreflex is built from the Fibreflex as insulated by the stainless steel foil (although it

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cool or often high temperature and corrosion-resistant metals may be used in insulation. When completed, the blanket fits around the outer length of the gas line pipe.

The most common metal blanket design made by Foster has a metal facing with insulating cores on the interior side. The face is set on the outside and is welded at the edges to keep out heat and fluids. A metal mesh screen supports strips and attachments for holding the blanket to the fuel pipe assembly. Help keep the blanket in design thickness and protect its outer surface against abrasion.

### PRODUCTION BRIEFING

► **Cutter Corp.'s Spectral Electronics Division, San Gabriel, Calif., plans to expand plant facilities, increasing production by about 500%**

► **Toronto Aircraft Corp., Dorval, Que., has awarded a new Air Force contract for production of F-106 interceptors and fuel probe assemblies. Terms also will finance maintenance parts for F-106**

► **Blackwood Manufacturing Co., Canada, Ltd., has engaged a division to engineer and manufacture special insulation to fit the needs of underground mining using "explosives" to break up mineral veins.**

► **Particulated plastic deep laminates** are suitable for forming duct liners, bags, angles, channels and shapes per se, have been developed by the plastic group of Republic Aviation's Manufacturing Research and Development Department. The device is composed of rigid epoxy resin compound containing reinforcing filaments such as aluminum oxide. Laged polymers are

supplied by Theodol Chemical Corp., Trenton, N.J.

► **Inductotherm Corp. has moved from Glenside, Pa., to a larger plant at 312 Thomas Ave., Ontario, N.Y. Move made in order to consolidate high frequency heating and melting equipment operations.**

► **Pittsburgh-Southern Chemical Company, Pittsburgh, and Imperial Chemical Industries Ltd., London, England, have submitted a joint application to the U.S. government for a contract under which the government would purchase \$100,000 short tons per annum of pyridine trisulfide metal over a five year period.**

► **Kelvin & Huon Co. has completed a 14,900 ft. physics research and development laboratory at Bristol, Pa. The structure will house engineering offices, design studio for nuclear work, and a chemical laboratory.**

► **Minnesota-Honeywell Regulator Co., Inc., has established an aerospace department at its plant at Taconic**

► **Rockwood Chemicals, Inc. will open a new plant in Kansas City, Mo., concentrating on production of Phenox Liquid and phenolic plastic resins. Plans include the installation of a full-scale plant and the manufacture of full line of chemicals and resins. Plant will be managed by L. C. Wright with Dr. A. E. Winters as technical director.**

► **Longest data recording set installed at New York International Airport will be tested in September for the Port of New York Authority. Tuck's motor operated sliding door manufactured by International Steel Co., Rosedale, N.Y., will be tested on cables 40 ft. off the ground from 150-ft. height. There are 21 ft. high total walls will be 62 ft. high.**

► **Schaefer Manufacturing Corp., Euclid, Ohio, developer of a carbon dioxide process has formed Specialty Co., Div. Division of French Carbon Co., to set up a pilot plant. The process uses carbonated gas and at first is casting reducing carbon particles while the base, therefore, retains some strength and surface finish are required.**

► **C. W. Marquardt Corp., San Juan Capistrano, has become a subsidiary of the Garrett Corp. The acquired firm will continue to operate under its present name, serving the San Francisco area with tools, metal and industrial supplies. Ralph V. Vincent will retain his position as general manager, and E. G. Marquardt, former president, will remain as a member of the board of directors.**



**FIRST FIAT-PRODUCED F-86K** is surrounded by other planes during delivery ceremony at Turin. The F-86K is NATO version of North American's F-86D, with classified radar removed and radar receiver replaced by four 20-mm. canons. Fiat has orders for 100 F-86Ks.

## Fiat Pushes NATO F-86K Production

The first of 100 F-86K Fiat is building has been delivered to USAF for acceptance to the Italian air force, which is slated to get 125 of the Sabres. The remainder are scheduled to go to Holland. The Italian firm has also been chosen to overhaul other F-86s now flying with Western air forces in Europe and has started on the first lot of 72



**OVERALL VIEW OF FACTORY FLOOR**, shown plane in various stages of assembly.



**SABRE NEARS COMPLETION** at Fiat's Castle plant. The planes will start the delivery to the Italian and Dutch air forces.

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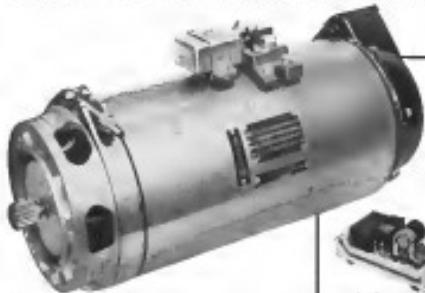
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Loud is producing these difficult structural fittings in mass quantities at the same time maintaining a high degree of quality.

#### CASE HISTORIES

Today's airplane is being built out of huge forgings rather than fabricated sections. The two main fittings which combine fuselage core trusses coupled with wing tips into one single forged and machined structure of 100 million pounds of strength. This fitting is over 4 feet long and is machined on one of Loud's ten 500-ton 200-ton Capstan Hydraulics. Advances in design create more complicated machine operations.

The aerospace engineers of today are challenged in the development of the smallest parts. The strength, weight, surface qualities, and savings of considerable cost in fuselage diagonal structural fittings are a necessity in present day aircraft construction.

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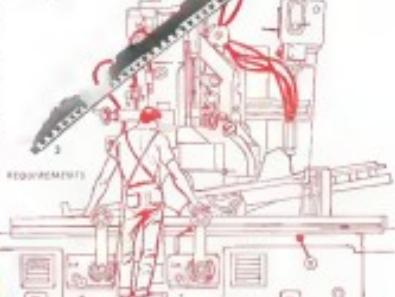
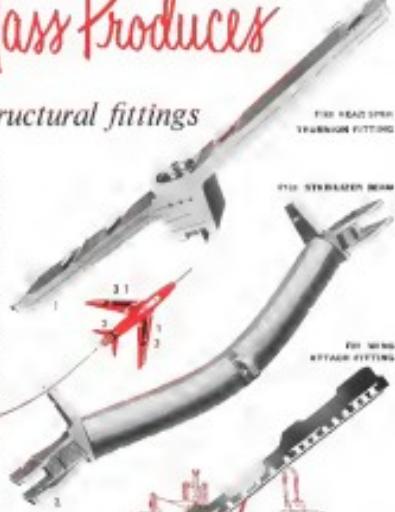
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final hydraulic press. (RFP PR 14000)

General Electric Co. Johnson City, N.Y., has contract systems for aircraft components and aircraft structures. (RFP PR 14000)

Matheson Industrial Corp., 35-25 110th Street, New York, N.Y., has developed a single stage, 100-ton, 100 ft. 211 in. (RFP PR 14000)

Metallurgical Components Corp., 1000 Prudential Plaza, Newark, N.J., manufactures aluminum, steel, and magnesium. (RFP PR 14000)

General Electric Co. (Pratt & Whitney) Division, 200 Southenger Industrial Park, Box 1000, Hartford, Conn., has a 100-ton (RFP PR 14000)

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Westinghouse Laboratories, Inc., 31 Winton Ave., East Pittsburgh, Pa., has a 100-ton hydraulic press. (RFP PR 14000)

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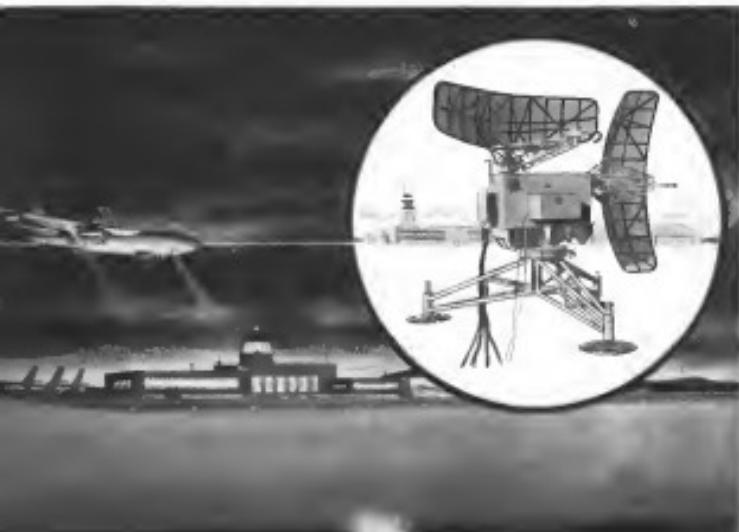
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**CERAMIC FURNACE AREA** houses the equipment used in heating and melting ceramics at high temperatures.

### New GE Lab to Push Research In High-Temperature Materials

By George L. Christian

Schenectady, N. Y.—A new \$1-million metals and ceramics facility, which will help scientists extend the boundaries of knowledge concerning very high temperature analysis, will be opened this week at the General Electric Research Laboratory near here.

Built at The Rock, the building is part of a \$17-million expansion of GE's Research Laboratory. The new facility underscores the company's leadership in the growth and importance of ceramics and ceramics in the nation's industry, particularly research in expanding stable of supersonic jet planes, ramjet engines and rockets.

GE's interest in ceramics approaches toward the refinement of higher jet operating temperatures, and the development of mechanical techniques and developing improved materials that can take higher temperatures without cracking or becoming brittle.

Developing and investigating new

The Metallurgy and Ceramics Department is headed by Dr. J. H. Heiles, research vice president, who has a staff of 216, nearly half of whom are professional personnel.

The importance of heat-resist the need for greater knowledge concerning ceramic strength is underscored by the fact that the efficiency of jet engines increases with high temperature, within certain ranges.

Heiles says two general approaches toward the refinement of higher jet operating temperatures, and the development of mechanical techniques and developing improved materials that can take higher temperatures without cracking or becoming brittle.

Developing and investigating new

metals at one job of Heiles's group. Right now, the main interest is in the high-temperature field in ceramics and refractory materials, but the final answer may be in a new, as yet undeveloped, material.

Heiles specified not far from Aviemore. While the design project is finished, the next 30 years as regard to jet turbine development—use of the toughest development areas in the field of high-temperature materials.

#### Ceramics

While the design project is finished, the next 30 years as regard to jet turbine development—use of the toughest development areas in the field of high-temperature materials.

Several recent combinations, such as titanium carbide or chromium oxide, melt with a high-temperature resistance, are light, strong, oxidation resistant, and have good high-temperature strength up to 3,000°, but they are brittle—so brittle that their thermal shock resistance is virtually no better than at room temperature.

The lab intends to find out what



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events are so brittle and how many occur. Solutions to these problems are dead ends; light air flow to cover up with erosion double enough to make them brittle or get clogged.

Hallcoen says GE's Carbide division is doing extensive work along these lines for the company's jet engine group at Evendale, Ohio.

#### Refactory Metals

To be practical for aerospace use, refractory, or high-melting-point, metals have to be relatively inexpensive and able to withstand extreme temperatures and yet be malleable. The most promising metals are molybdenum and columbium, Hallcoen says.

Molybdenum and its alloys can be made as strong as 1,800°F at 8316 is at 1,020°F. (8316 is an austenitic alloy currently used as the standard turbine basket material.)

But only poses several tough problems which have to be solved before it can go into a jet engine. Because it oxidizes readily, it cannot be used bare but must be coated. A suitable coating material must have these properties: It must be completely impermeable, adherent, able to withstand extreme temperatures without melting. But the oxidation must not be so strong as the base metal.

The other tough problem is that molybdenum purity must be controlled very carefully to within 0.01% to better-to make the metal irreversibly ductile at room temperature and, because moly is so strong at high temperatures, it is extremely difficult to change the ductility shape when it is hot.

Columbium is somewhat the opposite of molybdenum—it has excellent high-temperature strength characteristics but lacks some ductility at low temperatures. Columbium's oxidation resistance is good up to 1,000°F. Above this it accelerates. This can be improved, however, by alloying, according to Hallcoen.

If columbium is made ductile, it must remain ductile when alloyed. And it must be allowed to be used for turbine buckets because it is not strong enough in its pure form.

Hallcoen hopes these companies and others will continue their efforts to develop a ductile, high-temperature columbium, molybdenum or tungsten to handle more brittle materials. The result will be jet engine designs which will accept the relatively soft materials we are driving away.

Park says that his investigations have not yet yielded informative results. He wants to investigate these, however, because of their considerable high-temperature strength—although they do not have the favorable ductility of low ductility and sometimes poor oxidation characteristics.

#### Microstructure Investigation

Still another effort being made by GE scientists to obtain suitable materials for turbine buckets is headed by Dr. J. E. Berlin, manager of Ceramic Studies.

Berlin told AVIATION WEEK he has great hopes for ceramics, such as the silicon oxide bonded with columbium. He feels this has the ability to withstand temperatures up to 1,600°F and still have the correct thermal expansion and none of the brittle microstructure.

He has research centers around Cambridge investigating the behavior of ceramic materials in oxidized and low-oxide environments. The still also is doing into the relationship between strength and temperature of nonmetallic materials, including intermetallics. Among his projects is an investigation into the deformation and plastic flow of materials such as aluminum oxide.

#### The Laboratory

The new \$5 million research facility has four specific purposes:

- Develop new metal and ceramic materials and techniques for processing them.

- Explore significant processes in pilot plant scale and estimate cost of these processes.

#### Above, 2,300°F

•

The difficult problem of oxidation of molybdenum—at 1,600°F justifies a substantial and long research program and a large laboratory effort to overcome the low ductility and brittleness of certain forms. Dr. M. Park, Director of Materials Application and Evaluation Section. These investigations would apply metallurgical techniques to study the deformation mechanisms and thermal oxidation resistance characteristics of various materials. Park hopes that such research will "give us an insight to the development of oxides which will have acceptable low-temperature ductility."

"We are progressing towards our goal and are going to continue to do so in the areas from 1,000°F to 1,600°F. That is the main development of using ductile materials in propellant and, simultaneously, metallurgists are learning to handle more brittle materials. The result will be jet engine designs which will accept the relatively soft materials we are driving away."

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He has research centers around Cambridge investigating the behavior of ceramic materials in oxidized and low-oxide environments.

The laboratory lab has the third Sanderson furnace, located and installed in this country. The unit, powered by a 300-hp electric motor, will boil 1,100 lb of hot steel side rods into steel 0.100 in. thick in one pass.

Among the "firsts" claimed for the new lab is a high-rate hot slugging and roll and wheel control in concert. As cooling to 600°, it is in the only reversing rolling mill in the U.S. powered by a motor as seen in the first in the world to be controlled continuously by magnetic amplifiers.

Possibly the building is unusual in its unusual structure very much like the "Eiffel Tower" thousands of bolt holes, aligned throughout



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#### Above, 2,300°F

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## Three Firms Form Propulsion Pool

Research, engineering and production resources of the Marquardt-Austin Co. (engines), Reaction Motors Inc. (rocket engines) and Olin Mathieu Chemical Corp. (liquid and solid propellants) are being directly coordinated to seek faster advances in propulsion units for missiles and space vehicles.

One of the first tasks of the OMAR program is the development of propellants charges for missile specimens with Objectives in a test that will always fire and that has a fixed-time curve of appropriate shape for missile specimen. Coordination is not limited to such special problems.

The primary goal is to overcome limitations on applications of rockets and ramjets to missiles and aircraft. One application in certain to be in super-performance aircraft configurations, similar to the French mixed-powerplant Dassault 500 fighter.

Although Olin Mathieu over a substantial interest in both Marquardt and Reaction Motors, it was decided and determined to set up the formal OMAR organization to continue to be the further the merging of experience of the two engine makers with Olin Mathieu's in special fields.

The executive chairman is Harry A. Somers, technical advisor to Olin Mathieu's board of managers. Somers was Washington representative for Lear, Inc., after leaving the Navy in 1954. His last Navy assignment was commanding officer and director of the Office of Naval Research's Special Devices Center.

Other committee members include T. P. Walker, vice-president of Lawrence Radiation's jet, via chairman; John A. Driscoll of Marquardt; William P. Muller and Warren P. Turner of Reaction Motors; and E. Kevitt Herbold, Joseph H. McLain and John J. O'Neill, Jr., of Olin Mathieu.

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THE OH-10 aerial intercept manufactured by the Convair Aircraft Co., Wichita, Kan., is now on top of military installations. The manufacturer plans to sell the machine for passenger use but military orders were come first if the aircraft is to sell at \$48,000 to \$50,000.

## **Cessna Demonstrates New Helicopter**



**TAIL ROTOR GEAR BOX** of the CH-4 helicopter holds two bevel gears and four standard ball bearing ball bearings. This case is mounted with four machine screws which are held in place by two bolts.



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**Northrop Grinder  
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Northrop Aircraft's Hawthorne, Calif., Division has announced the development of a new high-speed grinding machine capable of grinding quartz, glass or metal to extremely high optical tolerances.

To be known as a "Refractionator" grinder, the machine, according to Northrop, is capable of completing in seven minutes tasks that formerly required as much as 35 hours to complete. It will grind Northrop optics, spherical, aspherical, parabolic, polyhedral, prismatic or other lenses which can reflect light. It will be produced by the Keystone Engineering Co. of Los Angeles.

A vacuum system is used for holding down effect of air draft up to 40 inches. A vacuum pit, which allows easy inspection of the hydraulic system, has been included beneath the machine.

A separate unit contains a 30-hp electric motor which drives a high-power hydrodynamic pump (12,000 psi) and a 280,000-psi, test

**Trident II Tests**

Fairchild's SD 9500 interceptor version of the French aircraft builder's Trident series is reported to include the performance of the SD 9500 that reached 995 mph last year in two of its three 50K nuclear motors.

Prototype of the SD 9500 Trident II made its first flight late last month and now is in the initial stage of its test program.

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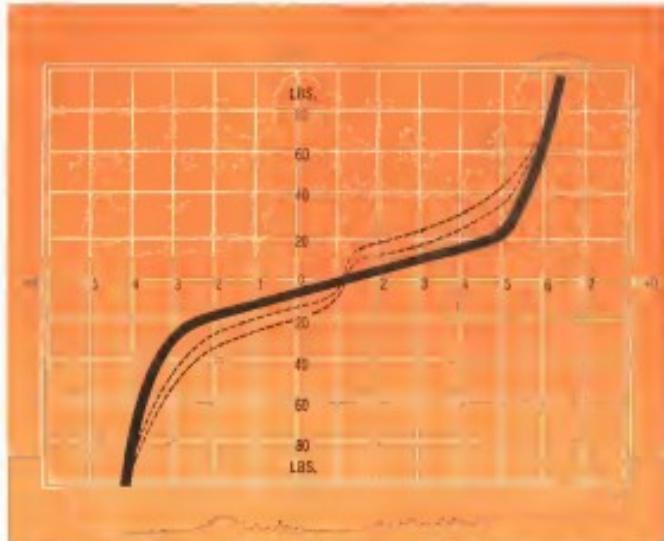
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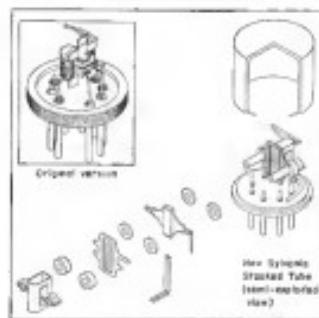
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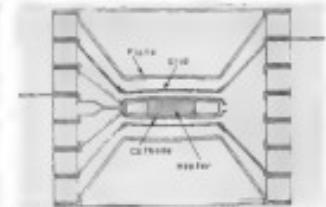
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NEW STACKED CERAMIC TUBE developed by Sylvania consists elements on isolated posts. Original model (left) used vitreous posts.



ANOTHER APPROACH—This tube, smaller and lighter-weight than conventional tube, is made of stack of dielectrics and spacers.

### Rugged Stacked Ceramic Tubes Move Into Pilot Production

By Philip J. Klass

Stacked ceramic tubes operating in ambient temperatures of 300-400°C are moving into the pilot production stage and will be available in limited quantities for avionics industry evaluation in the near future, announced by Sylvania Electronics Division McClellan under Navy BuShips and USAF procurement, that tube industry was fed back to the last year (AW June 25, 1955, p. 61).

The new stacked tubes feature rugged construction to withstand severe environmental vibration and shock. They are specially designed to facilitate

mechanical assembly and fabrication.

Sylvania expects to have a standard economic heat-tube, equivalent to the 616NT except for plate disruption, which runs three to five times greater, available in sample quantities in the near future, according to Harold E. Scott, company vice president. Standard ceramic versions of a two-anode and a four-anode equivalent of the 616NT will follow later.

Sylvania is building a pilot quantity of the 616NT for USAF source tests with delivery scheduled for next spring. Some of the tubes are scheduled to be

fermed out to Armstrong Radio, Inc. for evaluation and production. Sylvania also has developed heat-tube and RF-potentiometer versions of its stacked tube, according to William R. Wheeler of the company's Kew Gardens, N. Y., Product Development Lab.

#### Redesigned Sylvania Tube

Sylvania has redesigned the original tube, reduced last year, in that its size, weight and performance were equal to or even at 616NT equivalent, according to Wheeler.

Like the original version, the new Sylvania model consists of a buildup of cathode plates, grid, cathode stacked tube, and anode. The tube is a single piece, more than jacked in conventional tube, to permit high temperature operation. Most noticeable difference between the old and new version is that the latter has its tube elements stacked



8 Gram | 15 Gram | 58 Gram

**NEW SYLVANIA** stacked tube is smaller and lighter than earlier metal jacketed and conventional tube (left).



**NEW SYLVANIA TUBE** made by Sy-  
lvania improved stack construction.

an horizontal rather than vertical pipe (see photo, page 61).

There are other less obvious design changes, however, which Wheeler is parts has reduced interelectrode capacitance, increased overall tube structure rigidity and improved thermal efficiency. By substituting ceramic posts and a new clamping arrangement he's been able to reduce the weight of the previously used metal posts and rorets, resulting in a tube that is both lighter and more economical to manufacture at least, Wheeler reports.

A comparison of characteristics for the new SN 1734F with those for a 4100 are shown below:

	SN 1734F	4100
• L	6.0 ms.	8.5 ms.
• C <sub>c</sub>	2.2 μH	2.8 μH
• C <sub>m</sub>	0.5 μH	0.4 μH
• P	41	35

- C<sub>c</sub> = 1.1 μH
- C<sub>m</sub> = 2.2 μH
- C<sub>c</sub> = 0.5 μH
- P = 4 μH

Of particular importance for aircraft applications is the new SN 1734F, which retains 90% of the space required under existing aircraft. Compared to a maximum of 25 ms. possible with a 6101 exerted with 120C at 75 cps, the new Sylvanian tube reportedly generates only 18 ms. max when excited with 120C at 40 cps. An added advantage of the new tube is that it consumes only 140 ms. of heater power as compared with 490 ms. for a 6101, Wheeler says.

#### Other Stacked Tube Types

Sylvania also has manufactured stacked ceramic versions of both power amplifier tube plates lower left.

Photo to serve similar ratings at 20 to 30 have been obtained in experimental models, which Wheeler calls "very good." Power output figures and distortion figures are equivalent to those of conventional tubes, he adds.

Because of a lower grid temperature resulting from the use of stacked design, greater grid drive is possible with "no significant increase in power and no increase in emission efficiency," the manufacturer claims. "What we report," Sylvania has demonstrated an 800 watt tube which employs the same wave structure as the latest power tube, except that the heavy focusing tubes are extended to provide the primary shielding between grid and plate. A screen shield also has been added.

The original stacked tube is a negative-bias weighted almost twice as much as its conventional counterpart (19 vs. 8 grams). Sylvania's new tube, however, weighs only 12.5 grams, 50% less than conventional counterpart. This has been accomplished by reducing the thickness of the ceramic shell wall from 0.07 to 0.03 in. and switching from a single pin to a smaller six-pin ceramic base plate.

The new Sylvania stacked tube has the original version can be housed in a ceramic shell or where high temperature operation is not required—in a glass envelope. (The inherent "C" of the tube is the type number followed by the word "stack".)

The company is also investigating the use of a metal shell which can be used as an external sleeve for a heating power tube to provide better heat insulation or as a shield for an RTI amplifier. An added advantage is lower cost.

In addition, Sylvania is looking into "bulked" versions of both ceramic and metal shells to simplify the cutting and shell stacking process. With cutouts through a small copper tube in the shell itself, the shell can be sealed to the base without need for



**TURBULATED SHELL** helps to insure no vacuum and seal metal or ceramic tube envelopes. Sylvania adds.



**HEIGHT AT EIGHT** a new Sylvania ratings reference tube. Compare conventional 173 (left) and 7-pm resonance tube (center).



**HEATED STACK CONSTRUCTION** of tube tube is shown in exploded view. Individual tube elements and ceramic spacers are joined into their respective, flamed together to complete tube.



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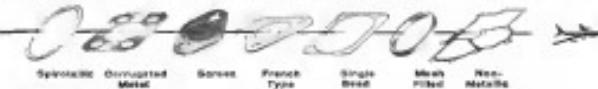
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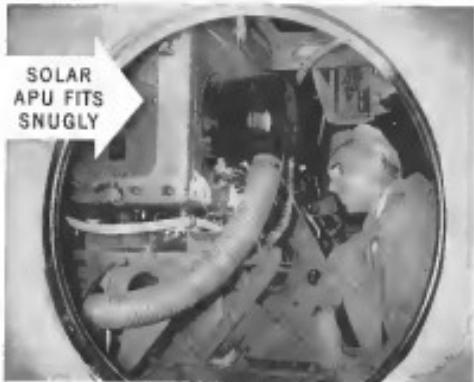


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William E. Stevens, Lockheed engineer, installs new APU installation.

### "Mars" installed in first C-121C

**SPECIFIC EQUIPMENT** on the Air Force C-121C—military version of Lockheed's Super Constellation—is the Solar Mars gas turbine-powered airborne generator which is snugly packed in the plane's tail, the compact, lightweight Mars unit providing instant power at the flick of a switch.

Host of the Solar APU in the missile, proven Mars gas turbines—recently updated by the Air Force—last 500 to 700 hours between overhauls. Similar units are being used on the Douglas C-130 and the Convair C-131B.



**INNOVATIVE DESIGN** Enhanced dependability is the basic premise behind the Solar Mars-driven power system.



Special designed Mars APU drives aircraft from the ground onwards.

### This is What Solar Offers You

When heat, noise/vibration and/or space specifications are problems, Solar can help you solve them. From aircraft to industrial applications, Solar produces turn-around and capital equipment. At various stages, Solar's experience since 1927 is available.



#### SPECIAL PRODUCTS

**Gas Turbines** Solar "Mars" 10 HP gas engines for auxiliary power units, aircraft starters, and other applications. Solar "Taurus" 500 HP air compressor is suitable and ratings extend models.

**Boilers**, "Solar-Pak"®  
Boilers and accessories:  
• 1000 lb. capacity.  
• From 10 ft. 6 in. to the  
world's largest, 20 ft.  
in diameter.

**Centrifuges**. Complete central apparatus featuring new design. Units available for removal of acids, bases, oil sludge and radioactive residues.

#### CONSTANT PROMOTION

Current services include aircraft  
engines and engine parts, parametric  
charting, service entry compre-  
hensive. Customers include the  
Army, Navy, Coast Guard and civilian  
operators in the U.S. and abroad.



**Plant** In Los Angeles, California,  
Solar has a modern plant. A total of  
10,000,000 sq ft of floor space  
approximately 8,000 employees.

**Research**, Research, development,  
manufacturing engineering  
staff. Equipped with all types  
of carbon alloys, copper alloys,  
and titanium and its alloys.

**Services** All types of metal  
fabrication—machining, stamping,  
rolling, casting, coating,  
bonded for strength, limited  
series production. Extensive laboratory  
facilities. Complete quality control.

#### INFORMATION

For more information regarding  
Solar Gas Turbines  
or any Solar products  
or services, write:  
Solar Aircraft Company,  
Downey, California  
Sun 834-11, 20000.



# ESSO AVIATION TURBO OIL 35

### ONLY OIL APPROVED FOR LUBRICATING VIKERS VISCOUNT TURBO-PROP ENGINES

An exclusive Esso achievement...Esso Avitwin

Turbo Oil 35, a synthetic product, is the only  
gas turbines lubricating oil approved by  
Bristol-Brayton, makers of the four "Dart" turbo-prop  
engines powering the Viscount "100" Series.

Only a synthetic lubricating oil can meet  
all the exacting requirements of these turbines

engines; they cannot be met completely by a  
mineral oil, even of the highest quality.

This is another Esso "first," result of tech-  
nical research and foresight on the part of  
Esso aviation lubrication specialists working  
in close cooperation with British and U. S.  
aircraft engine designers and builders.



INTERNATIONAL AVIATION PETROLEUM SERVICE

#### All of these airlines rely on

##### Esso Avitwin Turbo Oil 35

For propeller aircraft and engine lubrication of their  
Viscount aircraft, the firm and still the only turbo-  
prop aircraft in scheduled service:

- British European Airways • Air France • Air Union
- Trans-Canada Airlines • Trans-Canada Air Lines
- Canadian Airlines • British West Indian Airways



## Weight-saving 450°F FLUOROFLEX-T "plumbing" in the MARTIN SeaMaster and its 4 engines

The world's first multi-jet attack seaplane uses the world's first Teflon®-compound hose.

Fluoroflex-T H3500 hose assemblies are used to convey fuel and oil, and as vent hoses in the sleek Seafighter... and are on its four powerful turbojet engines too. All in all, they add up to a sizable saving in weight over other hose types.

Fluoroflex-T lightweight, corrosion-resistant hoses are made with Teflon® compounded tube, 304 stainless steel braid, and blowout-proof fittings. Their flexibility stays the same from -30°F to +450°F... indefinitely.

H3500 assemblies are Service approved for synthetic fuels, oils. You'll be hearing about them in more and more engines, airframes and missiles, where they solve high temperature operating problems. For more data, ask for Bulletin FS-2.

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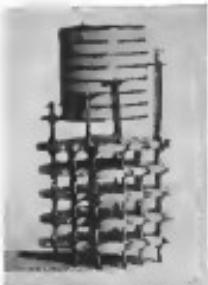
### RESISTOFLEX CORPORATION

Bethelville, N. J. • Western States, Berkeley, Calif.

Our 25th year of service to key industries



Fluoroflex-T spiral back-up rings—another Resistoflex product from fluorocarbon resins—are also in the Seafighter, contributing to the reliable performance of hydraulic control circuits.



THICKERTOY & STACK-Electric sole is shown assembled atop Thickertoy-type resistors.

performing the operation under an evacuated bell jar.

Sobieski has applied the same thick-tube design to the construction of a two-wire gas diode voltage regulator tube which reportedly shows stability characteristics close to the tubes better than present conventional VR tubes and measures only 0.3 in. in dia. x 0.6 in. long. (For a new comparison with conventional VR tubes, see photo, p. 43.)

Figures cited by Wheeler indicate the following characteristics for the new Type SG-2122A tube:

- Operating voltage: 54.5 v.
- Current range: 15 to 51 mA.
- Regulation: 2 volts max.
- One-hundred-duty 17 sec.
- Voltage drop: Under 1 mv.
- Maximum sole: Under 0.3 in. at 19G, 45 cps.

#### Siemens Taken Seen

The Elster CD-8 stacked ceramic high power version of the GSNT is expected to be available in sample quantities by the end of the year. The CD-8, with each of its two sections rated for 15-20 watts dissipation, will be particularly suited for use in servo amplifiers where considerable output power is required.

A slightly smaller, lower-powered tube trade, the CD-18, measuring only 1 in. in diameter, should be available in sample quantities early in 1958, as will a pentode, according to Elster vice president Sop. The CD-18 is small enough to fit atop a Thickertoy type resistor, where it terminates either directly to the resistor's wire wires (see photo, above).

Elster is developing an RF pentode equivalent of the GAKS, called the



## on the McDonnell F3H DEMON

GENERAL LABORATORY ASSOCIATES, INC.  
Norwich GLA New York

AIRCRAFT IGNITION AND ELECTRONIC EQUIPMENT



For stationary, or vehicle-type engine-driven ground power units.

## Engineered General Electric generators add dependability to your ground power products

Since before World War II, manufacturers of stationary and self-propelled engine-driven ground power equipment have turned to General Electric for the best in a-e and d-e generators, and for quality engineering services to develop and apply these components to their products.

**BETTER ENGINEERING.** Thousands of a-e and d-e generators have been applied to a variety of requirements by General Electric engineers. The resultant resource of experience benefits you. G-E personnel will work closely with you in designing generators to meet space and mounting limitations and electrical requirements. Such experience and co-operation assures you of better product performance.

**BETTER PERFORMANCE.** G-E generators are manufactured to rigid quality controls required by commercial and military specifications. Easily installed a-e and d-e generators are engineered to require a minimum amount of maintenance and will give your product more permanent power with longer, more dependable life.

**ENGINEERING HELP.** If you have a generator or "packaged" electrical equipment problem in ground power, bring it to General Electric. Qualified design and application engineers are ready to assist you. For more information, contact your nearest G-E Apparatus Sales Office, General Electric Company, Schenectady, New York.

841

**GENERAL**  **ELECTRIC**

CD-15, which should be available sometime next year.

Seng and the now standard Elnac tubes have performance characteristics comparable to those of conventional tubes but with more rugged construction and better high-temperature capability. The company has tested its tubes at 100°C and feels that their characteristics remain "stable." Seng says

### Elnac Design

Elnac's stacked-tube design differs markedly from Sylvania's. The Elnac tube consists of a nested stack of anode spacers and metal ring-supported electrodes (grid, cathode, plate, filament) all forced together to form both the supporting structure and external heating jaws plates, p. 87, lower right.

The basic design is easily adapted to a variety of tube types. A twin-anode is demonstrated by building a double cathode, with the two electrodes at the center and the anodes (plate) at either end.

By adding one grid on each side, the tube becomes a triode-anode. By adding an additional grid, it becomes a pentode.

The tube is first assembled in three subassemblies: the end sections, each consisting of an anode-plate, and the center section, comprising the cathode-bent. The three subassemblies are then assembled in a chamber, sealed and baked.

The individual electrodes and spacers are fired on by soft-ceramic, both internally and externally. The final baking treatment of the whole process permits rapid cooling assembly by controlled pressure, Seng says.

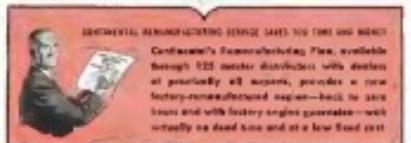
Prototype machines for mechanical fabrication of the tube elements and assembly into completed tubes are now being developed by Elnac to prove out the basic vibration principles. By the end of the year, Seng reports, some of the operations will be fully mechanized.

Seng believes most failures of conventional vacuum tubes can be traced to poor structural rigidity. The extremely rugged structural arrangement employed in the Elnac tubes leads Seng to predict that they will have about a definite life once design and fabrication techniques have been fully refined.

Elnac's activities in the vacuum tube field represent a new venture for the firm. It built its reputation as the field of power and transmission tubes



The buyer of an airplane with  
**CONTINENTAL POWER**  
obtains two plus values available  
nowhere else. One is Continental's  
famous reliability; the other, the  
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OPPORTUNITIES UNLIMITED—REGISTER TODAY AIR FORCE RESERVE TODAY



**new team impetus  
for supersonic propulsion**

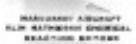
Added impetus to being given to rocket and missile development by a unique new industrial team, for the first time, substantial experience in supersonic engine development is linked with chemical experience in the manufacture of special fuels as integrated research and development programs. This has been

Aided especially at the advancement of high-speed long-haul air-cargo aircraft and missile power plants, these affiliated companies pro-

A major producer of chemicals and manufactured products, Ober Mathiesen makes special Jack at first



The Mathieson products program respects the importance of propylene oxide, ethylene oxide, anisole, phenol, benzene, diethyl ether, and solid propellants. Other chemical linkages and programs are under development.



## NEW AVIONIC PRODUCTS

## Components & Boxes

- 

Box 3300 W. 16th St.,  
W. Mex. **Texas Foundation**

• Digital ohmmeter, Model DDM-1, a self-balancing Wheatstone bridge, gives



## ARMY AND AIR FORCE H-21's TAKE TO THE AIR IN CIVIL DEFENSE EVACUATION

### 121 Top Ranking Government Officials Rapidly Moved To Safety During OPERATION ALERT—1955

At 10:05 p. m. on June 15th when the alarm sounded at the nation's capital for OPERATION ALERT—1955, 12 Piasecki H-21 helicopters descended upon the Pentagon area to evacuate top government and military officials.

For the first time helicopters were used for a mass evacuation in Civil Defense operations. Minutes later our country's key personnel were safely from the Pentagon enroute to relocation centers.

Helicopter carrier service to the Pentagon helped maintain business as usual during the three day period.

Our hats are off to the men and women of the Federal Civil Defense Administration and other participating government agencies.

We salute the pilots and crews of the U. S. Army's 5082 Helicopter Transportation Company and the U. S. Air Force's 516th Troop Carrier Group who, with their H-21's, successfully accomplished this air evacuation.

We at Piasecki are proud that the Army and Air Force selected the Piasecki H-21, "Work Horse" helicopter for this important mission.

### VERSATILE PIASECKI HELICOPTERS IN EXTENSIVE MILITARY SERVICE

The H-21, the only transport helicopter in service capable of carrying 20 passengers, is used for transporting combat troops and carrying loads of military equipment and supplies weighing up to two tons in Army and Air Force operations.

Operation Alert—1955 is another typical example of the versatility of this and other Piasecki helicopters.

The operational advantages inherent in the Piasecki tandem rotor configuration are being demonstrated in the many tasks of performers under all types of conditions throughout the world. A commercial version of the H-21 will soon be available for civilian and industrial use.

This new chapter is another mark of Piasecki's continuing efforts in improving helicopter performance—to build helicopters to do more jobs and do them better than ever before.

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Army Recovery Board H-21 in Pentagon



H-21 Participating in Operation Alert—Philadelphia



H-21 Departing from Pentagon in Relocation Center



HELICOPTER CORPORATION  
WILMINGTON, PENNSYLVANIA

# Versatile WESTERN GEAR Hoist



**selected for new  
Bell anti-submarine  
helicopter!**

When Bell Aircraft Corporation developed its new HSL-1 helicopter for Navy anti-submarine detection and rescue work, it selected Western Gear to design and manufacture the airborne hoist aboard the unique twin rotor aircraft. This Western Gear hoist lifts 400 lbs at 50' per minute. The hoist shown in inset above, weighing 28 lbs and similar in design to that selected by Bell, can lift 400 lbs at 100' per minute, spooling more than 100' of 1/16" cable. By modifying the gear train it can lift up to 1600 lbs at 25' per minute. A level wind ensures accurate spooling and the hoist is equipped with ratio noise filter to comply with AN specifications.



Western Gear's more than 40 years of experience supplying important components for aircraft of practically every description was a major factor in its selection by Bell to design and manufacture this vital hoist for airborne use. Knowledge obtained since 1935 enables Western Gear to provide a speedy economical solution to any problem involving the mechanical transmission of motion or torque. Why not avail yourself of this experience to solve your problem? Western Gear engineers will be glad to offer their help and necessary designs from your blueprints or specifications. Address General Office, Western Gear, P.O. Box 182, Lynwood, California.

"The difference is reliability" • Since 1868

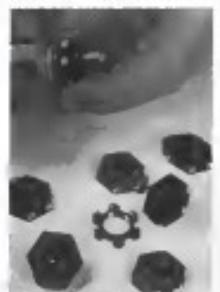
**WESTERN GEAR**  
ENGINEERS AND MANUFACTURERS

Please list Lynwood, Pasadena, Belmont, San Francisco (Calif.)  
Seattle and Houston — Representatives in principal cities

autostraining digital read-out accurate to within 0.05% ± 1 digit from 50 ohms to 5 megohms in four ranges. Range is selected by keypad, automatically located decimal point and key selected for ohms or kilohms in read-out window. Electro Instruments, Inc., San Diego, Calif.

• **Shake table.** Series 8,000, for vibration testing, develops 600 lb. force over the frequency range of 5 to 5,000 cps. Frequency response of shake table (without external load) is flat within ±1 db from 2,000 to 5,000 cps, and within 5% from 5 to 5,000 cps, according to manufacturer. The new wideband shaker will operate from single frequency, complex sine wave, or sweep cycling inputs. Caldynne Co., 120 Green St., Winchester, Mass.

• **Universal counter-timer, Model 4351000,** provides a sharp digital readout with decimal point indicated. Operating range in frequency is from 10 cycles to 100 kc and time, subtraction 40 microseconds to 10,000 usec, each with a period range of from 1 to 10,000 cycles. Time and period measurements are accurate to within ±10



## Panel Seal Is Locknut

New "Panel Seal" large machine, sheet and vinyl cutouts of fragile gaskets and seals fit panel hole in which mount a mounted device consists of a silicone rubber seal and vinyl sleeve that mount and can be installed easily by substituting it for existing designed set screw. Seals switch to panel. Panel seal also serves as a locknut, reducing danger of loosening under vibration. Design specifically engineered requirements of MIL-H-4151 and can be operated at -50°C to 200°C temperatures. Farnel, Inc., 83 Main St., Little Ferry, N.J.

microseconds and frequency measurement to within 1 cycle in crystal oscillator stability, which is ±1 part in one million. Datatronics Corp., North Hollywood, Calif.

## FILTER CENTER

► **World's Smallest Digital Computer**—Watch for Lattice Electronics to announce a new low-cost digital differential analyzer only slightly larger than an electric typewriter. The new model 30-subprogram Lattice 20 reportedly will sell for less than \$10,000. If required for logic or push-top logic and gate, plus or three input, bipolar output equipment are included, price would be around \$14,000. Lattice's address: 716 No. Franklin Rd., Berkeley Hills.

► **Navy RTCA Member**—Three new members have been elected to the Radio Technical Committee for Airborne units, bringing RTCA membership to 123. They are:

• **Fight Safety, Inc.**, Flushing, N.Y.  
• **Machine Works**, Woodside, N.Y.

• **Western Union Telegraph Co.**, New York, N.Y.



## systems engineers

SALES OFFICE

## AIRLINE INDUSTRIES

**TRANSMITTERS.** Receiver for airborne fire control system, designed for incorporation into aircraft fuselage. It can be used in all types of aircraft and includes receiver, transmitter, and conversion sections. **RECEIVERS.** Two types of receiver for aircraft fire control system, designed for incorporation into aircraft fuselage. One receiver is for incorporation into aircraft fuselage and the other is for incorporation into aircraft fuselage.

## AIRLINE NAVIGATION SYSTEMS

**ACCELEROMETERS.** Orientation of aircraft fire control system, designed for incorporation into aircraft fuselage. It can be used in all types of aircraft and includes receiver, transmitter, and conversion sections.

**ROTARY DRIVES AND DENTRALS.** Components of aircraft fire control system, designed for incorporation into aircraft fuselage. One receiver is for incorporation into aircraft fuselage and the other is for incorporation into aircraft fuselage.

**WIRELESS TELEGRAPHY.** Receiver for aircraft fire control system, designed for incorporation into aircraft fuselage.

Write or call:

Mr. Robert E. Schaefer, Manager

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Prop or jet... single- or multi-engine... trainer... intercooler, triplex or tanked transport—Twin Coach Aircraft Division is probably unique among America's great manufacturers in its ability to produce major assemblies for many different aircraft types.

That's because we're aircraft specialists. Twin Coach Aircraft:

Division's five plants are devoted exclusively to production of airframe major assemblies. We build no other products... do no other work.

This is important because it means your airframe assemblies are built by experienced aircraft specialists... more miles per acre as to produce to specification, at the lowest possible cost.



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Other divisions of Twin Coach Company make:  
• PORT EXPANSION DEVICE • PARCEL CAROUSEL AND PROPANE ENGINE  
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General Assembly, a combination power-roller and slot milling machine that can remove up to 18 inches of material per minute, is just one of many hundreds of modern, high-speed machines, used



## WHAT'S NEW

### Telling the Market

"Questions and Answers on Electron Microscope," eight-page booklet available from Research and Control, Inc., 3000 Avenue Dr., North American Philips Co., Inc., Dept. 8, Yonkers, New York, N.Y. Available from the publisher. Data on pocket battery oscillator PW 421B; 4 Index; and design data on three photomultiplier types 12330, 12331. Control components for industrial use, catalog 1945. Automatic Electric Sales Corp., 1015 W. Van Buren St., Chicago 7, Ill.

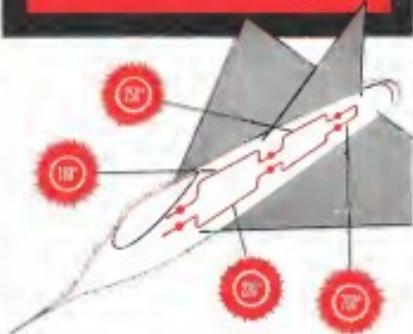
Automatic lecture cycling control for Army Commanders, bulletin P-7721, Barker-Campbell Co., 1490 Rock St., Rockford, Ill. Includes photographs and assembly instructions. Thickness gauge, a Soddy, Bausch & Lomb Inc., 418 Fairfield Ave., Stamford, Conn. Hermetic seals produced by the Advac封接合 process, bulletin, Advanced Vacuum Products Inc., 18 Liberty St., Stamford, Conn.

Vibration control module, model NGH, for noise level metering, Bulletin 138-RM, Baldwin-Prestwich, Inc., 345 High St., Providence, R.I. Shows Zehnert gas switch, Preliminary Data Sheet 104. Also, double-pole double-throw environmental gas switch, Preliminary Data Sheet 105. Micro Switch Division of Minneapolis-Honeywell Regulator Co., Freeport, Ill. ... Sealable assembly of metal parts, metal frame used through drilling, gas deoxidation and metal salt annealing testing, catalog, Caseless Sub-Zero Products, Room 200, Glendale Rd. at Peacock, Cincinnati 29, Ohio.

ImpactIDGraph used in packaging, temperature, pressure, multidimensional and quality control, bulletin, ImpactID Graph Corp., 1000 Euclid Ave., Cleveland, Ohio. New complete line of boats, bulletin H-17, H-18, H-19, H-20. Hove Marine, Birmingham Corp., Milwaukee, Wis. ... Magnetic amplifier, teleflex regulated dc power supply, bulletin, Perkin Engineering Corp., 345 Kalamazoo St., El Segundo, Calif.

Precision lathe and precision aircraft components catalog, data sheet on Series 1100 lightweight resistance valves for 1,000 psi hydraulic service, Aircraft Products Co., 380 Church Road, Bedford, Pa. ... Carbide blocks for aircraft landing gear, bulletin GF-252, Carbide Dept., General Electric Co., Detroit, Mich. Positive air extinguishing equipment, bulletin, Aeromac LeFrance Corp., Elgin, N.C.

**An Edison First!**  
**Separate alarm points in**  
**a single circuit**  
**with a continuous coaxial**  
**cable fire detection system**



Edison was the first to offer a fire detection system allowing reading cables having different temperatures

alarm points to be separated in the same circuit. Developed in the world-famous Edison Laboratory, the system permits a single loop to protect a number of sites varying in temperature—with a single control unit.

Exclusive spring clips and the single flexible sensing cable assure ample sensitivity even in irregular and inaccessible areas. Other features include:

- rapid response—responds rapidly to fire exposure, equals "Fire Det." immediately
- fire detection system—eliminates possibility of false alarms due to moisture or external effects
- easy installation— $\sim 20$  ft. per loop, weight imperceptible per foot

We invite you for further details on this superior fire detection system... designed for today's high-speed, high-performance aircraft.

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# Aviation Week Buyers' Guide

An Annual Publishing Service  
of Industry-Wide Usefulness

PUBLICATION DATE: NOVEMBER 28, 1955

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- KEY to the Major Buying Influences in the Half-Billion Dollar Aviation Market

November 26, 1955, as all-important, needed publishing service will be available to the aviation industry... AVIATION WEEK's Annual BUYERS' GUIDE. The dramatic development of aviation into today's multi-billion dollar giant-reaching into all phases of manufacturing—demands a constant flow of products and materials from tens of thousands of separate suppliers—who make a comprehensive, complete source book of supplies and manufacturers a "one stop" for all segments of the industry. AVIATION WEEK'S BUYERS' GUIDE serves this intelligence need with an information service of year-round usefulness, placed directly into the hands of some 37,000 key aviation engineers, managers, men, design and per-

forming personnel—men who make up aviation's real buying influences . . . In the industry itself, in the Air Force, and throughout the Government.

The latest developments in military procurement will be covered in a special report. Included in the detailed information to be presented will be: Air Materiel Command; Air Research and Development Command buying practices, personnel listings by name, procurement contacts, etc.; All-inclusive listing of manufacturers of unclassified and allied products, categorized for maximum utility under six major headings: Aircraft; Airframe and components; Armament; Fuel Equipment; Landing Gear; Powerplant; Missiles; Airframe and components; Equipment, including ground-handling, Powerplant, Avionics, Communications systems and equipment, Radiotele control systems and equipment, Instrumentation and controls, Navigation systems and equipment, Components and devices, Test equipment, Computers and data processing equipment in airborne, ground-based or shipboard applications; Supporting Groups; Data systems, Electrical, Ground equip-

ment, Hardware, Hydraulics, Instrumentation, Materials—including fuels, plastics, and chemicals, Tooling, Nuclear Power Systems, Accessories and components, Design services, Economic lubrication, Airlines and Airports; Scheduled carriers, Non-scheduled carriers, Cargo carriers, Ground equipment, Lighting.

Including in not up to provide quick, ready reference to literature for all products. In addition, advertisements and product listings will be keyed to each other for ready reference. AVIATION WEEK'S BUYERS' GUIDE also will carry Trade Name and Distributor listings—making that publication the most complete single source of buying information available to the aviation industry today.

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\* Average net paid circulation, 31,093 (June, 1955 ABC Statement). Paid circulation of current weekly issues more than 31,000. Current weekly print order exceed 37,000.

## AVIATION WEEK

A Division of FREDERICKS

## BUSINESS FLYING



HELIO COURIER production has at least one plane at Mid States Manufacturing Co.

### Licensee Plans Big Courier Output

The Mid States Manufacturing Co. of Pittsburgh, Kan., has announced plans for the production of 30 more planes for the production of 30 more planes by the end of 1955 and for an early 1956 output of two planes a week in the Helio company's manufacturing plant.

Mid States already has made some initial deliveries of the new plane to Courier distributors, all of whom have been signed by the Helio Aircraft Corp. of Kansas City, Mo. Helio also is negotiating for foreign dealers for the Courier.

Fully completed production of the open cockpit, single-engine biplane will start a year after the prototype was certified by Civil Aeronautics Administration (AW, July 12, 1954, p. 2). After certification, the company will add full-fledged Couriers to provide full customer service to setting up a production line.

Only minor changes have been necessary as a result of these service trials, the company reports. These corrections included the absorption of some vibration in the cabin area, the improvement of the gas tank 200-lb. capacity at low flying speeds and the reduction of the propeller blade which had been vulnerable to damage while the plane was parked.

Because of firm sales are on the books, the earliest delivery dates are now open after December.

Priced at \$13,500, the Courier is a development of the "twin place" design by Prof. Otto C. Koenigs of Massachusetts Institute of Technology. It

features a cruise speed of 157 mph and can fly at approximately 50 mph fully loaded. Large side and floor windows at low speeds (the plane can take off in 75 ft.) fully loaded in an 8-in. cabin area is designed to take heavy impact loads.

Another Helio licensee, Fleet Manufacturing Ltd., has received Canadian approval to manufacture the Courier airplane in Canada. The plan is currently running tests on a Courier fitted with Edo floats.

### Custom Twin Beech Conversion Offered

The conversion of North 11s into custom-built planes should apparently be the future of Remington-Warren Manufacturing Co., a specialist in remodeling business aircraft. Headquarters is at Lambert Field, St. Louis, Mo.

The company already has sold three of its "Custom 11" Twin Beeches.

Some 11s have been converted to custom conversions only recently.

In fact, "Custom 11" is being fitted into the company's plan for a standard line of conversions which were initiated with the DG-3. Remington-Warren has sold about 130 of the latter based on a book of standards that permits any one of its three original and conversion models to turn into identical air crafts.

BW has its eye on the approximately 100 Twin Beechcrafts that are

(AW May 16, p. 28). Sale is awaiting a report by Commerce Department on the possible market effect of releasing flight crews to civilians.

The plane features a lengthened cabin resulting from removal of the rear bathhouse and new windows that are at 16-in. greater size. The cabin is equipped with Remington-Warren reclining passenger seats having removable head rests. Reference to the cockpit has been enlarged by removing the standard instrument panel and using "avionics" type

If the customer chooses a Beech 18 for conversion, BW will remodel it to the new interior configuration at approximately \$10,000 at a cost of \$15,000. The conversion fee will add a "Custom 11" with two front airbags and engine for about \$60,000. A prototype "Custom 11" has been on a nationwide demonstration tour with Western "Sky" Helio, BW sales manager.

### PRIVATE LINES

Safe Flight speed control and life-preserving instruments will be distributed in Denver, Aspen, Steamboat Springs, Stapleton Airport, Colo., which services eastern Wyoming areas. The instruments are expected to be particularly useful for the low-speed flying done in that area prospecting.

Two Learjet business transports have been purchased by U.S. Steel Corp. and another has been bought by Birmingham Corp., Detroit, Mich.

Three Sikorsky S-55s have been delivered to Helicorp Oil & Refining Co., El Dorado, Tex., for use in offshore drilling operations in the Gulf of Mexico, bringing to 10 the number of S-55s operated by firms in the area. Helicorp's systems will be maintained and operated by Rotol Industries, Calif.

Civil aircraft shipments by airframe weight totalled 1,179,000 lb. in May, marking 485 airplanes shipped at \$11.8 million. Unfilled orders for civil aircraft of 3,000 lb. and over totalled 144 in May, 10% over the backlog a year ago.

Business plane shipments by tonnage in June totalled 485 aircraft with dollar value of \$6,994,000. Shipments by seven from the previous month totalled 460 aircraft worth \$6,701,000. June's figure includes 485 planes with

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place. So much because plane totals  
2,674 aircraft valued at \$96,145,000.

New travel insurance plan for air  
taxi and charter operators provides pas-  
senger coverage costing less than one cent  
per mile of airline mileage, the underwriter reports. Premium on  
\$10,000 insurance for 150-mile flight  
would be about 15 cents. But local  
policies covering all the operator's charter  
aircraft would be about 10 cents. Policies are based on  
number of flying hours. Policies are issued by American Underwriters, Inc., Ann Arbor, Mich.

**Fletcher Aircraft Corp., Rosewood,** Calif., plans immediate production of  
92 additional FU-24 stable aircraft for  
foreign governments. CAA for speed-  
tand, passenger and cargo carrying.  
One has delivered since May 1953. It is  
in New Zealand for government work.  
An order of 100 planes to Cuban Pres-  
sorp. Aviation Co., Opened in 1951, the  
Havana airport can't handle it, so it can fly  
1,250 ft. from its hangar roof to landing area.  
One version of the plane is a single-  
person carrier. Powered by a 225-hp  
Continental. The FU-24 is priced at  
\$15,000.

The last aircraft, ordered for test each  
next year, is the 40-seat version. It will be an  
all-metal aircraft, reported to be  
150% faster than existing planes. Performance  
will be top speed 118 mph, cruise 112  
mph, climb 1,000 ft./min., 9,500 ft., top altitude  
17,000 ft., range 675 miles and  
1,650 ft. landing speed about 30 mph.

A second plane, plane will be the  
B-150, similar to the 302, except  
that it will carry a 125-lb. cargo  
cargos. Both types will sell for from  
\$9,300 to \$11,000.



**NEW FAIRCHILD COMMANDER** features a 30-in. extension of the leading edge of the wings, providing additional cabin area, and revised propeller nacelles that enclose the engine exhaust separator tubes for additional streamlining. The longer cabin allows greater flexibility in interior arrangements and more leg room than was available in the earlier 360. Two Lycoming dry-sump GO-480-DA engines of 275 hp each give the 900A a top speed of 211 mph and maximum range of 1,944. 800-ft. mounted maximum allow 300-ft. endurance. New placement of the engine exhaust tubes has increased engine cooling by 15%. Am. Douglas Eng. Corp. reports initial deliveries within 12 months. U.S. Air Force has ordered 500. Sixty more are to be delivered to the Israeli Air Force before spring 1958. Job 75-10. Grumman motors will be delivered at manufacturer's cost. The new 360 is priced at \$76,500. Luf. Flotilla, Oslo. Production now is at the rate of two weekly; will be stepped up to about 10 a month in a few weeks. New Commander plant to double its present production plant capacity and use the current facility for modification.

AVIATION WEEK, August 22, 1958

Nashua Lumber Co., distributor for  
Southern California and Nevada. Lock-  
heed will use the plates to form canopy  
as special requirements. The new aircraft replace two Beech Bon-  
anza used on these missions.

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Monelco 200 non-explosive lineage contains chemical methods of K-17 with the additional virtue of aluminum foil encapsulated with pressure-sensitive adhesive.—Jewett Manufacturing Co., North Haven, Conn.

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Multiblaster electric feed truck has 2,000-lb. capacity without counter weight, 4,000-lb. with.—Levitt-Shapley Products, Inc., Watertown, Mass.

Diaphragm control valve Series 400 can be used for steam, water, air and liquids in hot oil and various component parts.—Minneapolis-Honeywell Regulator Co., Industrial Division, Philadelphia, Pa.

Ind-X portable laboratory mobile field capture and fractionation to produce micro-therapeutic radiopharmaceuticals in check-out structures. Small 41-pint pressure capsule X-ray Unit. Unit can be used with any X-ray generator.—Ind-X Corp., Seattle, Wash.

Metallographic microscope has over-sized focusing stage with interchangeable stage plates for transversal or longitudinal sections. Available with polarized and birefringent lenses.—Bausch & Lomb Optical Co., Rochester, N.Y.

Turbomolecular turbopump Series 31 runs speed ranges between 100 and 5,000 rpm for full-scale analysis. Turbomolecular drive does not affect the accuracy of the Miction ultrathin-film indicator.—Miction Instrument Co., 412 Lincoln St., Denver 3, Colo.

Two-wire sleeveless welding cable reportedly weighs about half as much as conventional copper welding cables.

Stainless steel capsules of stainless and other ferrous—Ev-Cold Corp., 1280 Oklahoma Blvd., Denver 12, Colo.

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**HELICOPTER LEADS DISASTER DRILL**—The U. S. Coast Guard and the American Red Cross combine forces to practice highly effective rescue techniques in a simulated disaster. The drill took place off Brooklyn, New York.

Having led two surfboats to the beach, a Coast Guard Sikorsky H-34 hovers nearby to effect any further rescues necessary. Versatile Sikorsky helicopters are in reserve service in Coast Guard units.

## AROUND THE WORLD WITH SIKORSKY HELICOPTERS



**CONGO COPTER**—Belgian World Airlines officials prepare to test one of three Sikorsky S-61 helicopters soon to fly over Belgian Congo jungles. The helicopters will span and drop supplies in the never ending battle against disease-bearing insects. Belgian will operate these S-61s along with the S-62s which preceded this jungle work at the Leopoldville area.



**HELICOPTERS RESCUE 93**—Two H-34 Sikorskys from the U. S. Air Force's Air Rescue Service last March rescued 93 men, women and children from a storm-swept South Carolina lake. They were stranded on icebergs and small islands when violent storms struck suddenly. The helicopters made more than 20 trips to bring the marooned people to safety on the mainland.



### HELICOPTER HISTORY:



**First helicopter  
crosses by the Army**

In November, 1942, the first helicopter to be sent overseas, Sikorsky R-4s, were delivered at Stratford, Connecticut, to the Army Air Forces. They were disassembled and loaded onto cargo planes for the long flight to the China-Burma-India wartheatre.



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structures selected in structural designs and made up of interchangeable sections, the larger houses radio operating equipment and powerplant, the other used for radio maintenance work—Lars Oerstrand, Inc., Elkhorn & Goss, MI.

Model CE Cyclograph handles rapid, non-destructive testing and sorting of randomly mixed or accurately processed known and unknown parts—J. W. Dix Co., Englewood, N.J.

SG-1000 oiler, made in Switzerland, handles all kinds of oils and especially viscid ones. It can be used with inexpensive stainless steel tanks and permits use of outside tank—Morco Machinery Co., Inc., 183 Lafayette St., New York 3, N.Y.

Model 501 Reson Volumatic pump gas converts high pressure gaseous helium to low pressure. At the rate of 50 psi and 6 cu ft, it automatically converts a vacuum gas to 12 psi and 80 cu ft. Handles all standard gases—Brown Int'l., 56 Broad St., New York 4, N.Y.

Campbell-Venox concrete handles heavy, sharp, alkaline, hot or cold material by means of a variety of rigid belt wrenches and cloths—Campbell Materials Co., 18614 Fitzpatrick, Detroit 27, Mich.

High frequency unit for tall structures is available for Tewantin models L-1-3, 500, L-1-50, L-1-50 and 100-F—Tewantin Corp., 1220 E. 152 St., Cleveland 14, Ohio.

Spanwise flexible, dimensionless ducting provides high resistance to heat conduction or absorption and is used with flexible air conditioning units for winter. During hot weather conduction and consists of a fiberglass liner and flexible and heat-treated outer soft-PVC Tubing Corp., Glaston, Conn.

Portable gun tester is used for rapid production check of belted, open and semi gun and for inspecting incoming shipments of guns. Stripchart recorder is available to provide permanent record of each test—Arch Instrument Co., Inc., 101 Hulman St., N. Quincy, Mass.

High-frequency shaking table has three and seven operation speeds with a maximum capacity of 100 lb to 15 in over front side and up to 13 in over rear side. It features fully automatic cycle control of starting, soil movements and travel control—Mossach Machine Tool Co., Sidney, Ohio.



Boeing's achievement in which new KC-135s are being deployed at altitude

**New milestone in America's aerial defense system**

A new milestone in the development of our war planes came into sight when the Air Force crews from Boeing—the nation's first jet-powered tanker/trainer, those now Boeing-crafted KC-135s—left their vital tanker/trainer mission from Boeing's Oregon assembly facilities and refueling equipment and aircraft—including the bombers of nine than 600 KC-135s.

The KC-135 is an advanced version of the Boeing propeller-driven Stratocruiser. This new craft, designed and built by Boeing in Seattle, Wash., with the jet engines imported from the Convair F-102, is the first aircraft to meet the requirements of the KC-135 program. It has performed beyond expectations. Back of its out-

standing performance in Boeing's vast background of experience pioneering the B-47 and B-52 jet bombers—across two planes that served as the current era of long, mid-air refuel. The KC-135 benefits from Boeing's unique experience developing aerial refueling equipment and aircraft, including the bombers of nine than 600 KC-135s.

Boeing's Stratocruiser is now tooling up for KC-135 production. Already substantial subcontractors have been placed with companies from coast to coast for participation in the manufacture of this, today's first fleet of jet tanker transports. This is part of

Boeing's policy of moving along to production and delivery to 500 units of every Air Force fighter aircraft.

The company has this goal—to produce for delivery the most advanced and dependable jet tanker, and the lowest cost possible—now and later. This is a Boeing tradition carried with such pride in the mid-1950s. Those, for instance, and Superforts of World War II, today's KC-135 propeller-driven bombers, and the requirements, KC-135 and B-52 jet bombers. The jet prototype, less than six months flight time, that the KC-135 will, no doubt, surpass, established new, high standards of performance.

**Statement: We believe "Silent Beat" is an attempt to discredit the United States Air Force. Discrediting the Air Force among our friends and enemies is a primary goal for the military's critics.**

**BOEING**

# AIR TRANSPORT

## Lufthansa Seeks Transports for Growth

By Gerald W. Schreder

**B**ERM-LUFTHANSA German Airlines, which on March 31 became an operating airline for the first time since 1946, is in the market for new transports when it begins to place in service its first aircraft. All aircraft will come in the planning stage by late 1957. To this the carrier will have to decide upon specific models by the end of the year because of the average lag of between 20 and 24 months between order and delivery.

The leading contender thus far appears to be Lockheed Aircraft Corp.'s helicopter-powered Electra. The US aircraft builder, which has sold the Convair line eight 1494 Super Constellations for trans-Atlantic service, is placing the Electra in competition with Lufthansa's own. The first flight of the Electra, however (AW, Jan. 27, '54), is scheduled for just about the same time Lufthansa wants delivery.

### Expensive Planes

Officials of the revised airline began moving towards expansion after the first period of operation gave them a chance to assess the results of years of planning.

With the four Convair 340s purchased after long consideration the carrier operates five flights a week to London, three to Paris and two to Madrid. On the same Atlantic route, four LH Super Constellations are making roundtrips a week to New York.

When the four LDFCs go into service next March, the carrier plans to extend its trans-Atlantic services to Rio de Janeiro, São Paulo and Buenos Aires via Dakar in Africa. European Airway flights probably will be concentrated to New York at a later date. Other plans include service to the Near East or in Tibet.

### Encouraging Verdict

In almost every instance, the company's decision on aircraft purchases has been encouraging.

Sixty German aviation observers and Lufthansa bought the wrong type of planes for its requirements when it purchased Convair 340s for European routes and Super Constellations for trans-Atlantic service. "This is not true," carrier officials assert. "We now know that we bought the right type of equipment at the right time to do a certain job."

With its present equipment, Lufthansa's air and ground crews have



LUFTHANSA'S now-familiar logo is placed to Lockheed LDFC Super Constellation

worked out a relatively smooth operation after the brief shakedown period. "Our people hardly ever discuss the Convair or the Super Constell. They are in both operations and maintenance," reports one LH director. "We have, of course, selected those planes for continued use, especially the Super Constell. It's our plan to take off from Berlin and land at New York. It's another thing to have to turn planes and crew and take off and land a dozen times in one day."

"Of the LH's hours on Super Constell, 100 had flown by July 10, 1955; 211 total hours training hours only. Our personnel has never had progressive, systematic training in modern aircraft; this is in contrast to other lines whose personnel have grown with and into each new type to come from the assembly lines."

"Plane training for the Super Constellations has been conducted with an Lockheed 1049 and a Hawker Lockheed 107, more now as co-pilots, with Trans World Airlines positioned as chief pilot. Some Lockheed flight engineers still on the trans-Atlantic route, but several LH flight engineers have been checked out by the Lockheed flight engineer stations in Hamburg.

### Experienced Maintenance

The engine's centralized maintenance is located in Hamburg and has gone into use of Europe's most up-to-date equipment. Lufthansa also has a number of maintenance experts of experience with the U.S. Air Force, Naval Air Fleet and foreign airlines. In addition, some former Lufthansa employees reported the trials of the new LDF. The carrier now employs



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### Proving Trials for Britannia 100s

The Britannia 100 prototype series flying over a dense forest formation. There were three constructed that fit the British Overseas Airways Corp. fleet. Each had a capacity of more than 1,000 passengers in eight-decked-seating loads. Routine proving trials for the four planes are scheduled to begin this month.

1,100 persons in Hamburg, 400 of them on maintenance jobs.

Maintaining at Elberfeld is run by a cadre of mechanics trained by KLM Royal Dutch Airlines at Amsterdam. One group of 13 men were trained by KLM via Cessna, another group of 14 were checked out on Super Constellations. The Dornier 320 line was chosen for that training because it operates both types of transports.

Some 150 Lufthansa engineers also went through KLM courses and now are qualified to teach at the Hamburg base.

### Lufthansa Pilots

Pilot training started in November 1953 when four Lufthansa pilots began dislocation courses at Cologne. These men, and a second group, were then sent to England and received British commercial pilot licenses.

These two groups were then sent to Gold Coast, Gold. In August they then to the U.S. standards.

By the summer of 1956, the airline estimates it will need around 136 trained pilots. Already 50 will be personnel for service to London, Manchester, Glasgow and Edinburgh and for flights to Manchester to Dublin, the U.S. and Canada.

The Comair airline who gets rights to Central America via the Azores and Niue, Hong Kong and Singapore can be used to intermediate points en route to the Far East, Indonesia and Australia.

In Africa, Germany will be granted landing rights in Nigeria for flights to the Union of South Africa. U.K. carriers obtained rights to use airports in the Federal Republic for routes to Scandinavia, South Eastern Europe, the Near and Far East and to West and South Africa.

Aside from the U.S. and the U.K., German authorities are now working at bilateral treaties with France, Belgium and Switzerland. Icelandic discussions have been started with the following nations: Ireland, Britain, Sweden, the Netherlands, Spain, Italy and Australia.

### Traffic Forecast

Lufthansa now is carrying 90% of capacity and hopes to increase this to 60% by next year. "We were unable to cash in on the peak eastbound business from America," Hahn said, "so we're still able to do so better next year." Hahn said, "in 1953, we'll start to pick up a bit more on the westbound fall business this year, though."

The tourist season is to begin later than after last year on German U.S. routes since use of the route will allow the line to sign Sherman and Gander.

On load factor, Lufthansa is banking on increased freight and air-mail business and hopes that German and U.S. postal authorities will agree on an increased Lufthansa slot.

### CAA Grounds Carriers

Cold Automotive Administration last week issued a circular providing for large increases in carrier Area Finance Corp. and Processor Air Transport, changing ownership of Lufthansa to full passenger violations of regulations.

A 10-day emergency suspension of the operating rights of each of the Florida-based carriers was invoked Aug. 12 by CAA.

CAA also instituted a safety investigation proceeding with the Civil Aeronautics Board by filing complaints alleging 37 cases of safety violations against each carrier. Area Finance and Processor Air Transport were ordered to stop operations for 10 days to review the complaints and request a hearing on the case which has been assigned to CAA Safety Examiner J. C. Goldwell.

CAA charged both carriers with operating in excess of pilot flight time limitations and with aircraft compartment doors had exceeded the required inspection time limits. In addition, Processor was alleged to have operated aircraft in overloaded condition and Area Finance was charged with operating with unqualified crews.

The two carriers have been engaged in both consumer cargo and military charter work and have operated in Southeast Asia. They are members of the Association of Southeast Asian Airlines.

## Mohawk Hopes to Replace DC-3s; Wants All-Convair 240 Operation

By Gordon Conley

**Ithaca, N.Y.—**Mohawk Airlines believes it will be able to reduce the annual operating costs of its three Convair 240s by at least \$44,000. The firm's cost is made good, the local source says, when plans to switch from DC-3s to all 240s is completed (AW Aug. 15, p. 12).

Mohawk is the first small airline to buy 240s and the second to make definitive plans for replacing its current DC-3 fleet. Pioneer Air Lines tried to shift to Martin 2-0-2s in 1953 but gave up, so the larger carrier turned to Mohawk and the Civil Aeronautics Board seemed to condone the purchase with minimum study.

Southwest Airlines with CAA support last year for an operation that put three 240s on high demand SWA/City Center and nine DC-3s on several local service flights. Allegheny Airlines started a similar combination in the Mobile Atlantic states this summer with four 240s and 14 DC-3s. Present plans for both SWA and Allegheny call for no more beyond a mixed fleet.

### Procedural Change

Mohawk expects to save its money through operational changes made when the airline incorporated savings with its 240s last year. These include:

- Quick shutdowns and climbs. With the 240s' presented passenger value, the local service carrier can discern from 7,600 feet to Newark Airport at a rate of 1,000 feet per minute. This cuts approximately 15 minutes off the DC-3's 10,000 feet of 530 rpm.

Mohawk President Robert E. Peck said last fall shutdowns and climbs at Newark will use at least \$18,000 in savings annually. The carrier has 240s for 12 months of service. He predicted a return for the investment contribution (R/K) during 40% of all DC-3 flights.

- Single-engine stop. The carrier now starts down only the right engine during emergency stops, reducing time of passenger landing gear to a maximum of three seconds. With a power-on poweroff turning over, Mohawk said, it's able to eliminate auxiliary ground power units.
- Rolling magnetic checks. The carrier's flight crews are following Mohawk's lead of running aircraft after the car tire by checking magnetic wheel alignment.

• Cargo loading. The local service has the choice of mechanized loading equipment at the three-minute stops, finding it faster to self-luggage by the transport and handle manually.

Mohawk plans to get some passenger service out of its Convair 240s, increasing the transport's capacity from 40 to 44 seats. This compares with 28 seats in the DC-3.

### Increased Advantage

"We've convinced there is a way to increase the 240's seating capacity without going to a high density (51) or congressional," says Peck. "But we want more operating experience before we try anything."

One possible way to make the change is to use Mohawk's strategic position to be in control of the airways. Mohawk is in the mix of the leading and robust investments to the fixed-wing nation. The space would provide just enough room for four additional passengers.

The local service airline's biggest problem with the Convair Liner are maintenance and the transport's lead long-haul load.

During July the fast aircraft of 240s operation, Mohawk completed only 88% of its Convair flights, compared with 97% for the DC-3. Peck said the maintenance situation was due partly to the carrier's recent entry of experience with the new equipment.

Because of breakdowns in the carrier's operating equipment will increase during July and August but are expected to decrease as September after summer vacation period completes their shake-down period with the 240s.

Peck says the Convair's load limitation is very serious, although he believes his new aircraft is the best of the present short-haul transports.

The smaller Ithaca of the Mohawk 24-2 is in revenue first, as are typical, the 24-2 could not be operated economically over Mohawk's route, he said.

"Our Convairs have a gross weight limit of 40,000 lbs. Their maximum allowable seating weight, however, is only 38,000 lbs. Mohawk's heavy load traffic loads are the 125 and 130-mile segments out of New York to Utica and Binghamton and an 80-mile segment between Utica and Albany on the Buffalo-to-Boston route. The average Convair bottom of approximately 200 gallons an hour costs about a \$40 taking off at full gross load for the 20-hour and 30 minutes route it has."

The plan here is that Mohawk, in its orbiter, is not permitted any such shape length.

"It appears that Mohawk is not only unable to use the full load carrying capacity of its Convair on its routes but if it were to take advantage of its capacity possibilities half load would be the factor, it still would not fully use the complete weight carrying capabilities of the carrier's present aircraft," he said.

"In other words, the weakness of the carrier's maintenance is lack of experience with the new equipment," he said.

(This is the second of a three-part series on Mohawk Airlines.)

## Air Freight and the North Pole

**Los Angeles—**The short cut-distance productive value of the transpolar route from California to Europe is being willingly demonstrated by the Scandinavian Airlines System. It is being utilized to bring passengers from Los Angeles to the North Pole.

Gives short distance in West Coast cities and directness at the time of departure but Nov. 26, the carrier has given enough in round-trip costs for SAS to open a new freight office at Los Angeles International Airport. Additional service is scheduled to start during the winter months, according to SAS District Manager Peter Tengström. The airline now has three flights weekly to each destination. Each flight operates with a 2,200-lb. load of cargo on the DC-8.

The main factor driving the transpolar route is the growing popularity of the short-cut services. Last June 22, Los Angeles to the North Pole took 12 hours, 1,100 miles. The round-trip distance from New York to Europe is considered too far to change and often by over a day or two resulting in a European flight home or prolonged end-existing costs and losses.

Cargo shipments to Europe have been limited to small cargo, machine tools, Hollywood film and television equipment, Douglas Aircraft Company stamping parts and equipment to worldwide shipping points. Then the first item low soft metals, fresh cut flowers, frozen turkeys and produce.

SAS is developing contracts for imports and exports. They will be initial contact in setting up a distributor in Sweden for a Northern California bottling and manufacturer.

# Air France Revenues at New High But Rising Costs Keep It in Red

For-Gross operating revenues of Air France in 1954 totaled more than \$132 million—an increase of 17.4% over 1953 and a new high for the company—while operating and capital costs rose by 16.1 per cent, according to the company's annual report which has just been made public.

As expected the company showed a deficit for the year of \$3,385 million francs (just under \$9,000,000). The loss figure is officially reduced, however, by an \$8 million subsidy granted by the French government.

Total revenues on all services of the Air France system in North America totalled up to 99% over 1953, based on ton-kilometres. The number of passengers in North Atlantic area reached 40,700. While this record leaves Air France in sixth place among trans-Atlantic carriers, it represents an increase of 14 percent over the previous year as compared with an 8% rise for all companies operating North Atlantic services.

Air France's labor force reached 5,915 on the first of January, 1955, representing an increase of 3.4% for the year. Two thousand plus employees were hired during 1954, reaching 36,513. Wages were steady and increased for nearly forty percent last autumn.

Apart from an addition of six Vickers Viscounts and four Breguet 760 "Doux Paix," Air France's fleet remained substantially unchanged. In 1955, however, delivery of eight Super Constellations 2019Gs and another Breguet will substantially alter both the capacity and the competitive position of the line. Two additional 2019Gs are expected to be delivered before April, while the remaining four will be delivered by December, 1955 and 1956. Due to the failure of the 1954 report to mention plans for replacing the HHD-32, three Douglas' high-wing replacement for the DC-3 which will be available in 1956 and 1957. Earlier reports had indicated the line's willingness to take up to 24 of the new planes which are planned for series production by Societe Nationale des Constructions Aeronautiques du Sud-Ouest (Socac) up to a total of 150 units. Air France was still awaiting 38 DC-3s at the end of the year.

The recent report indicates that plans for the new aircraft have been delayed until after the 35 billion franc figure forecast earlier in the year. The announcement has not yet appeared but has been delayed for five years in applicable to all unannounced equip-

ment, through Miami City Municipal Airport, Sioux City, Iowa, through Sioux City Municipal Airport, and Winona, Iowa, through Winona Municipal Airport.

## APPROVED

Agreements between Northwest Airlines, Delta Air Lines and various other carriers relating to inter-carrier arrangements.

Contract of carriage between Delta Corporation, The BAA Company, Cathay, Far East and Northeast Airlines with certain passengers.

## ORDERED

CAB compliance counsel to produce relevant documents relating to the Great Lakes enforcement case subject to review by the commission as soon as possible. The examiner's ruling relating to the various documents is vacated.

For American World Airways, Latin American Airlines temporary rate and rate of fare proposed by the Board is to stand as soon as rule by the board is issued.

For American World Airways, Latin American Airlines temporary rate and rate of fare proposed by the Board is to stand as soon as rule by the board is issued.

For American World Airways, Pan American Airways temporary rate and rate of fare proposed by the Board is to stand as soon as rule by the board is issued.

For Pan American Airways, Pan American Airways temporary rate and rate of fare proposed by the Board is to stand as soon as rule by the board is issued.

Agreement of National Airlines, Eastern Air Lines, Midwest Airlines and Pan American World Airways relating to New York-Minneapolis nonstop consolidated and nonstop for business, before an examiner.

Brown Airways' temporary certificate for service to Ft. Lauderdale, Fla., and Bogota, granted June 9, 1954, is withdrawn. Brown's certificate for Route 101 is extended as of the same date and the carrier is issued an amended certificate for Route 101 authorizing nonstop service between Sioux City and Chicago via Winona.

For United Central Airlines application for a Detroit-Bethel route via Erie, Pa., marketed at the End-Point service route.

Czech language contained in a Makarivsk Airline document obtained from the account of the End-Point service route is "incorrect." Investigation of an air service between Prague, Czechoslovakia and Athens and the need for certification of National Airlines, Eastern Air Lines or Southern Airways is on the route.

## DISMISSED

Brown Airways' application for service to Phoenix, Ariz., at the request of the applicant.

## DENIED

Application of City of Fort Smith, Ark., and the Fort Smith Chamber of Commerce, Council Airlines and Coast Airlines for service between Fort Smith and St. Louis, Mo., via Ft. Lauderdale, Miami, and Key West and Havana, Cuba.

Petition of Trans Caribbean Airlines and Overseas National Airways for reconnection of the two Atlantic cargo routes.

An Express International Corp. request that we deny publication of its letter relating to the investigation of manner relating to indirect revenue and losses in transportation of property.

# Airline Traffic — June 1955

	Expense Passengers	Revenue Passengers Miles (Millions)	Revenue Freight Load Factor	U.S. Mail Ton-Miles	Expense Ton-Miles	Freight Ton-Miles	Taxi Ton-Miles	Per Cent Revenue to Available Seats-Miles
<b>DOMESTIC TRUNK</b>								
American Airlines	10,829	7,003	68.38	10,018	941	939,377	985,004	66.15
Brill Airways	147,476	53,039	60.84	754,014	16,361	250,481	5,667,079	56.49
Capital Airlines	281,026	73,028	62.35	219,755	268,384	109,084	8,189,020	47.18
Colonial Airlines	47,709	10,345	58.31	15,755	6,933	95,410	1,206,568	53.23
Continental Airlines	26,255	—	57.04	62,514	15,961	123,383	3,189,987	48.88
Delta & S.S. Air Lines	176,884	79,499	68.02	191,403	803,295	164,958	8,547,397	48.34
Eastern Air Lines	147,715	64,711	60.09	810,089	419,450	179,369	28,821,288	51.30
Midwest Airlines	10,000	6,000	57.00	170,001	4,020	10,000	1,000,000	50.00
Northeast Airlines	18,599	11,799	56.46	10,000	2,647	45,737	3,051,291	51.43
Northwest Airlines	127,715	67,751	66.46	413,000	6,000	5,612,171	4,000,000	48.82
Texas World Airlines	165,506	105,154	73.77	380,000	554,131	928,301	31,055,000	48.82
United Air Lines	111,141	366,099	75.59	1,061,691	127,925	365,343	41,571,191	44.47
Western Air Lines	95,339	48,963	65.41	20,180	78,603	848,137	5,054,300	38.23
<b>LOCAL SERVICE</b>								
Allegany Airlines	10,771	6,041	55.43	6,770	10,447	590,370	914,315	91.41
Braniff Airways	8,028	1,064	53.90	3,075	1,806	3,135	196,533	51.15
Central Airlines	8,133	1,925	59.90	2,820	1,763	4,389	331,896	66.01
Frontier Airlines	16,393	4,087	48.87	14,495	7,584	66,666	494,926	56.85
Lake Cities Airlines	10,896	1,602	57.00	2,256	9,855	534,340	23,277	53.27
Midwest Airlines	22,179	4,156	61.46	4,463	4,000	8,474	415,200	61.46
North Central Airlines	10,978	2,000	55.16	16,143	22,717	1,645	1,645,000	46.87
Southwest Airlines	133,834	3,623	62.35	6,645	18,869	88,771	1,000,000	46.87
Transoceanic Aviation	35,275	6,845	58.64	18,700	9,711	74,993	550,179	58.46
Southern Airways	10,299	5,591	49.78	8,809	9,690	500,000	48.53	
Southeast Airlines	85,254	4,811	58.91	3,209	4,039	56,648	486,783	58.43
Texas Trans Airways	53,979	3,811	45.82	15,358	8,089	12,755	337,002	38.22
West Coast Airlines	10,950	3,213	47.98	3,999	2,137	10,311	389,900	38.81
<b>INTERNATIONAL</b>								
Brill Airways	3,059	7,070	56.95	32,080	—	81,888	984,978	31.50
Delta C & S Air Lines	4,395	3,000	52.78	7,083	50,596	538,000	49,360	48.36
El Al Israel Airlines	17,400	94,405	75.00	50,349	88,709	9,070,179	88.77	
Northeast Airlines	9,985	50,163	62.82	18,717	70,186	608,906	369,979	68.34
Pan American World Airways	—	—	—	—	—	—	—	—
Alaska	4,241	16,048	66.50	34,300	—	300,375	1,455,701	31.85
Air Atlanta	90,951	182,029	78.71	811,771	1,410,465	10,054,685	70.43	
Latin American	18,832	36,897	68.94	316,118	524,039	19,406,503	62.42	
Pacific	38,020	66,912	75.00	1,191,389	1,081,004	9,088,846	71.87	
Pan American-Globe Airways	13,714	12,395	55.82	30,038	93,856	54,018	1,759,377	55.13
Pan World Airlines	37,200	73,427	74.09	716,797	657,704	57,764	9,051,497	72.38
<b>HAWAIIAN CARRIERS</b>								
Hawaiian Airlines	36,533	6,934	66.20	3,503	—	955,185	566,980	39.63
Twa Pacific Airlines	70,417	9,459	61.84	901	59	12,027	321,484	38.38
<b>CARGO LINES</b>								
Diamond T Line	7,457	9,010	65.98	—	—	3,243,841	3,044,282	78.48
Riddle Airlines	—	—	—	—	—	864,659	844,591	180,000
Stolt Air Lines	849	3,544	92.68	3,216	—	4,971,288	4,879,573	72.84
<b>HELICOPTER SERVICE</b>								
N.Y. Airways	5,796	55	50.78	1,313	1,389	440	6,193	51.66
Los Angeles Airways	350	13	18.87	4,809	1,852	1,000	7,015	42.34
Heli-Airline	—	—	—	—	—	—	9,536	42.6

Compiled by AVIATION WEEK from airline reports to Civil Aeronautics Board



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"EMPLOYMENT OPPORTUNITIES" continued from page 15

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# EDITORIAL

## There Is No 'Gray' Security Area

Concern of American editors and scientists over the need toward greater restrictions on the free flow of public information from government agencies spread to the recent convention of the Air Force Association in San Francisco. One of the speakers at the AFA meeting was Thaddeus J. Koop, director of Washington news and public affairs for the Columbia Broadcasting System During World War II, Mr. Koop was associated with Bryan Price in the Office of Censorship. Here are some excerpts from his address that are of interest to the aircraft industry:

The federal government has become the principal source of information we need—such about atomic energy, our military strength, our plan for cold defense, our relations with other countries, even the planned earth satellite. The duty of keeping the people fully informed is one of the most important confronting our officials.

Our longing of a long past and free speech has been accomplished by the concept that government officials must operate in a goldfish bowl, that they can't even be subject to public scrutiny. Contrast that American viewpoint with a statement of the Communist revolutionary, Lenin, in 1920. He said: "Why should freedom of speech and freedom of the press be allowed? Why should a government which is doing what it believes to be right allow itself to be criticized? It would not allow opposition by lethal weapons. Men are much more timid things than gold. Why should we not be allowed to buy a printing press and democratic printing options calculated to embarrass the government?"

One misconception on the part of some government officials is that they can pick and choose what news they will release. The suggestion has been made that only "interesting" and "concerning" information be disclosed. But who is to be the judge of what is "interesting" and "concerning"? Certainly not the official involved, because he would then be able to pass on his own ideas, to seal up his mistakes, to avoid censures. The judge must be the public and the censorious who are the public's agents.

No elaborate procedure is needed to track a document. There is only one question which can properly be asked in determining whether to withhold information: Does it jeopardize the security of the United States? If the answer is "No," it should be released. If the answer is "Yes," there is a further consideration: Is it more serious for the American people to have the reference than it is to keep it from foreign circulation? In some instances this answer will lie in the affirmative. This could be especially true in regard to civil defense matters. In the event of an attack on the United States, the people would have an overpowering "need to know." Our very lives would depend on the receipt of a certain amount of information that undoubtedly would be of interest to the enemy. Yet in Washington today we hear reports that the Civil Defense Administration is not always given—even in confidential—information

that is vital for proper planning.

Another misconception is that there are some "gray areas" in the field of security information, poorly-defined areas where it is difficult to decide whether the security factor is paramount. These areas involve classified materials—usually scientific data—which first the Commerce Department and more recently the Defense Department have been trying to hush up. I fear they are trying to bottle a wolf-of-the-ether. I cannot help but feel that security areas must be either black or white, never gray. Information is either of a security nature and should be classified, or it does not involve security and should be released.

That, it seems to me, is the heart of the whole information problem. The government must put its house in order. How can this be done? It is not a matter of writing new directives. President Eisenhower's Executive Order on classifying information in 1953 was a considerable step forward. Rather, it requires a change of attitude on the part of many individual officials. So far they have taken the easy way. When in doubt, classify and segregate. One of the best things that could happen would be for the Budget Bureau to forbid the purchase of any more rubber stamps marked "Confidential" or "Secret." Any man with these stamps on his desk has an overwhelming urge to use them. I suspect that when President Eisenhower abolished the classification of "Restricted," most of the "Restricted" documents were promptly labeled "Confidential."

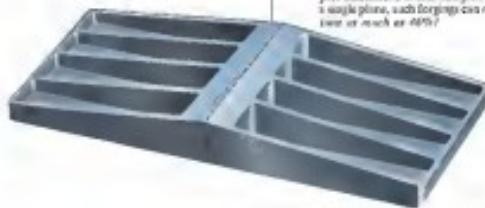
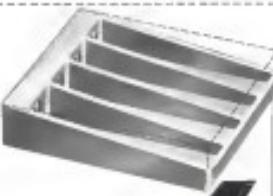
The problem, then, is getting an official into the frame of mind where he sees not at himself, "How little of this information do I have to give out?" Instead he should ask, "How much of this can I possibly release?"

We are discussing this subject of security of information at a time when President Eisenhower has made a dramatic proposal that the United States and Soviet Russia exchange aerial inspection of their military establishments. How that suggestion must have surprised some of the men who put the rubber stamp I mentioned. It would have turned temporary their longest notions about security. Even if the President's bid should come to nothing, it still could serve a great purpose in putting into a new perspective the question of how many secrets we really need.

Now, following this bold effort, comes the atom-farce evolution and its removal of much of the mystery that has surrounded international atomic work. As the Atomic Energy Commission said, "The collective knowledge of mankind on how to put the atom to work for material progress in all fields will be shared among the technical representatives of the great majority of the people of the world."

There are interesting events. When our leaders take steps to share information of this magnitude once considered secret, they are doing far more than adding to the enlightenedness of American citizens. When they argue that knowledge knows no national boundaries, they are strengthening the bonds of civilization everywhere.

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